

NASA PATENT ABSTRACTS BIBLIOGRAPHY

(NASA-SP-7039(39)-Sect-1) NASA PATENT
ABSTRACTS BIBLIOGRAPHY: A CONTINUING
BIBLIOGRAPHY. SECTION 1: ABSTRACTS
(SUPPLEMENT 39) (NASA) 63 p

N91-28042

CSCL 05B

Unclas
00/82 0030830

A CONTINUING BIBLIOGRAPHY
SECTION 1 ABSTRACTS



STI PROGRAM
SCIENTIFIC &
TECHNICAL
INFORMATION

ACCESSION NUMBER RANGES

Bibliography Number

STAR Accession Numbers

NASA SP-7039(04) SEC 1	N69-20701 - N73-33931
NASA SP-7039(12) SEC 1	N74-10001 - N77-34042
NASA SP-7039(13) SEC 1	N78-10001 - N78-22018
NASA SP-7039(14) SEC 1	N78-22019 - N78-34034
NASA SP-7039(15) SEC 1	N79-10001 - N79-21993
NASA SP-7039(16) SEC 1	N79-21994 - N79-34158
NASA SP-7039(17) SEC 1	N80-10001 - N80-22254
NASA SP-7039(18) SEC 1	N80-22255 - N80-34339
NASA SP-7039(19) SEC 1	N81-10001 - N81-21997
NASA SP-7039(20) SEC 1	N81-21998 - N81-34139
NASA SP-7039(21) SEC 1	N82-10001 - N82-22140
NASA SP-7039(22) SEC 1	N82-22141 - N82-34341
NASA SP-7039(23) SEC 1	N83-10001 - N83-23266
NASA SP-7039(24) SEC 1	N83-23267 - N83-37053
NASA SP-7039(25) SEC 1	N84-10001 - N84-22526
NASA SP-7039(26) SEC 1	N84-22527 - N84-35284
NASA SP-7039(27) SEC 1	N85-10001 - N85-22341
NASA SP-7039(28) SEC 1	N85-22342 - N85-36162
NASA SP-7039(29) SEC 1	N86-10001 - N86-22536
NASA SP-7039(30) SEC 1	N86-22537 - N86-33262
NASA SP-7039(31) SEC 1	N87-10001 - N87-20170
NASA SP-7039(32) SEC 1	N87-20171 - N87-30248
NASA SP-7039(33) SEC 1	N88-10001 - N88-20253
NASA SP-7039(34) SEC 1	N88-20254 - N88-30583
NASA SP-7039(35) SEC 1	N89-10001 - N89-20085
NASA SP-7039(36) SEC 1	N89-20086 - N89-30155
NASA SP-7039(37) SEC 1	N90-10001 - N90-20043
NASA SP-7039(38) SEC 1	N90-20044 - N90-30170
NASA SP-7039(39) SEC 1	N91-10001 - N91-21058

NASA SP-7039 (39)

July 1991

NASA PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY
SECTION 1 ABSTRACTS



National Aeronautics and Space Administration
Office of Management
Scientific and Technical Information Program
Washington, DC

1991

This supplement is available from the National Technical Information Service (NTIS), Springfield, Virginia 22161, price code A04.

INTRODUCTION

Several thousand inventions result each year from the aeronautical and space research supported by the National Aeronautics and Space Administration. The inventions having important use in government programs or significant commercial potential are usually patented by NASA. These inventions cover practically all fields of technology and include many that have useful and valuable commercial application.

NASA inventions best serve the interests of the United States when their benefits are available to the public. In many instances, the granting of nonexclusive or exclusive licenses for the practice of these inventions may assist in the accomplishment of this objective. This bibliography is published as a service to companies, firms, and individuals seeking new, licensable products for the commercial market.

The *NASA Patent Abstracts Bibliography (NASA PAB)* is a semiannual NASA publication containing comprehensive abstracts and indexes of NASA-owned inventions covered by U.S. patents and applications for patent. The citations included in *NASA PAB* were originally published in NASA's *Scientific and Technical Aerospace Reports (STAR)* and cover *STAR* announcements made since May 1969.

For the convenience of the user, each issue of *NASA PAB* has a separately bound Abstract Section (Section 1) and Index Section (Section 2). Although each Abstract Section covers only the indicated six-month period, the Index Section is cumulative covering all NASA-owned inventions announced in *STAR* since 1969. Thus a complete set of *NASA PAB* would consist of the Abstract Sections of Issue 04 (January 1974) and Issue 12 (January 1978) and the Abstract Section for all subsequent issues and the Index Section for the most recent issue.

The 154 citations published in this issue of the Abstract Section cover the period January 1991 through June 1991. The Index Section references over 5000 citations covering the period May 1969 through June 1991.

ABSTRACT SECTION (SECTION 1)

This *PAB* issue includes 10 major subject divisions separated into 76 specific categories and one general category/division. (See Table of Contents for the scope note of each category, under which are grouped appropriate NASA inventions.) This scheme was devised in 1975 and revised in 1987 in lieu of the 34 category divisions which were utilized in *PAB* supplements (01) through (06) covering *STAR* abstracts from May 1969 through January 1974. Each entry in the Abstract Section consists of a *STAR* citation accompanied by an abstract and, when appropriate, a key illustration taken from the patent or application for patent. Entries are arranged by subject category in order of the ascending NASA Accession Number originally assigned for *STAR* to the invention. The range of NASA Accession Numbers within each issue is printed on the inside front cover.

Abstract Citation Data Elements: Each of the abstract citations has several data elements useful for identification and indexing purposes, as follows:

- NASA Accession Number
- NASA Case Number
- Inventor's Name
- Title of Invention
- U.S. Patent Application Serial Number
- U.S. Patent Number (for issued patents only)
- U.S. Patent Office Classification Number(s)
(for issued patents only)

These data elements are identified in the Typical Citation and Abstract and in the indexes.

INDEX SECTION (SECTION 2)

The Index Section is divided into five indexes. These indexes are cross-indexed and are used to locate a single invention or groups of inventions.

Subject Index: Lists all inventions according to appropriate alphabetized technical term and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Inventor Index: Lists all inventions according to alphabetized names of inventors and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Source Index: Lists all inventions according to alphabetized source of invention (i.e., name of contractor or government installation where invention was made) and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Number Index: Lists inventions in order of ascending (1) NASA Case Number, (2) U.S. Patent Application Serial Number, (3) U.S. Patent Classification Number, and (4) U.S. Patent Number and indicates the related Subject Category Number and the Accession Number.

Accession Number Index: Lists all inventions in order of ascending Accession Number and indicates the related Subject Category Number, the NASA Case Number, the U.S. Patent Application Serial Number, the U.S. Patent Classification Number, and the U.S. Patent Number.

HOW TO USE THIS PUBLICATION TO IDENTIFY NASA INVENTIONS

To identify one or more NASA inventions within a specific technical field or subject, several techniques are possible with the flexibility incorporated into the *NASA PAB*.

(1) *Using Subject Category:* To identify all NASA inventions in any one of the subject categories in this issue of *NASA PAB*, select the desired Subject Category in the Abstract Section (Section 1) and find the inventions abstracted thereunder.

(2) *Using Subject Index:* To identify all NASA inventions listed under a desired technical subject index term, (A) turn to the cumulative Subject Index in the Index Section and find the invention(s) listed under the desired technical subject term. (B) Note the indicated Accession Number and the Subject Category Number. (C) Using the indicated Accession Number, turn to the inside front cover of the Index Section to determine which issue of the Abstract Section includes the Accession Number desired. (D) To find the abstract of the particular invention in the issue of the Abstract Section selected, (1) use the Subject Category Number to locate the Subject Category and (2) use the Accession Number to locate the desired invention within the Subject Category listing.

(3) *Using Patent Classification Index:* To identify all inventions covered by issued NASA patents (not including applications for patent) within a desired Patent Classification, (A) turn to the Patent Classification Number in the Number Index of Section 2 and find the associated invention(s), and (B) follow the instructions outlined in (2)(B), and (D) above.

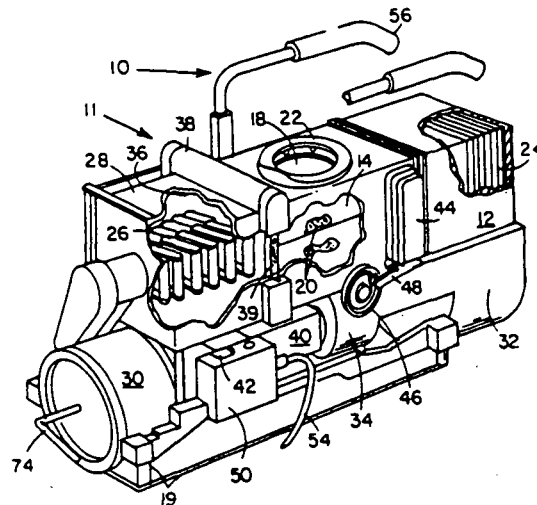
TYPICAL CITATION AND ABSTRACT

NASA SPONSORED

ACCESSION NUMBER → **N91-14724*** National Aeronautics and Space Administration. ← CORPORATE SOURCE
 Lyndon B. Johnson Space Center, Houston, TX.
 TITLE → **METHOD FOR WASTE COLLECTION AND STORAGE Patent**
 INVENTORS → WILLIAM E. THORNTON, JR., inventor (to NASA) and HENRY B. WHITMORE, inventor (to NASA) 24 Jul. 1990 15 p Filed 10 Aug. 1989 Division of US-Patent-Appl-SN-035401, filed 7 Apr. 1989
 NASA CASE NUMBER → (NASA-CASE-MSC-21025-2; US-PATENT-4,942,632;
 US PATENT APPLICATIONS → US-PATENT-APPL-SN-391911; US-PATENT-APPL-SN-035401;
 SERIAL NUMBERS → US-PATENT-CLASS-4-661; US-PATENT-CLASS-4-482;
 US-PATENT-CLASS-4-316; US-PATENT-CLASS-4-DIG.9;
 INT-PATENT-CLASS-A47K-11/00) Avail: US Patent and ← AVAILABILITY SOURCE
 Trademark Office CSCL 06K ← COSATI CODE

A method for collection of fecal matter designed to operate efficiently in a zero gravity environment was invented. The system consists of a waste collection area within a body having a seat opening. Low pressure within the waste collection area directs fecal matter away from the user's buttocks and prevents the escape of waste gases. The user actuates a piston covered with an absorbent pad that sweeps through the waste collection area to collect fecal matter, scrub the waste collector area, press the waste against an end of the waste collection area and retracts, leaving the used pad. Multiple pads are provided on the piston to accommodate multiple usages. Also a valve allows air to be drawn through the body, which keeps the valve from becoming plugged with the feces. A sheet feeder feeds fresh sheets of absorbent pads to a face of the piston with each actuation.

Official Gazette of the U.S. Patent and Trademark Office



KEY ILLUSTRATION

TABLE OF CONTENTS

Section 1 • Abstracts

AERONAUTICS For related information see also *Astronautics*.

01 AERONAUTICS (GENERAL)	N.A.
02 AERODYNAMICS	1
Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery. For related information see also <i>34 Fluid Mechanics and Heat Transfer</i> .	
03 AIR TRANSPORTATION AND SAFETY	1
Includes passenger and cargo air transport operations; and aircraft accidents. For related information see also <i>16 Space Transportation</i> and <i>85 Urban Technology and Transportation</i> .	
04 AIRCRAFT COMMUNICATIONS AND NAVIGATION	2
Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control. For related information see also <i>17 Space Communications, Spacecraft Communications, Command and Tracking</i> and <i>32 Communications and Radar</i> .	
05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE	2
Includes aircraft simulation technology. For related information see also <i>18 Spacecraft Design, Testing and Performance</i> and <i>39 Structural Mechanics</i> . For land transportation vehicles see <i>85 Urban Technology and Transportation</i> .	
06 AIRCRAFT INSTRUMENTATION	N.A.
Includes cockpit and cabin display devices; and flight instruments. For related information see also <i>19 Spacecraft Instrumentation</i> and <i>35 Instrumentation and Photography</i> .	
07 AIRCRAFT PROPULSION AND POWER	N.A.
Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and onboard auxiliary power plants for aircraft. For related information see also <i>20 Spacecraft Propulsion and Power</i> , <i>28 Propellants and Fuels</i> , and <i>44 Energy Production and Conversion</i> .	
08 AIRCRAFT STABILITY AND CONTROL	N.A.
Includes aircraft handling qualities; piloting; flight controls; and autopilots. For related information see also <i>05 Aircraft Design, Testing and Performance</i> .	
09 RESEARCH AND SUPPORT FACILITIES (AIR)	2
Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tubes; and aircraft engine test stands. For related information see also <i>14 Ground Support Systems and Facilities (Space)</i> .	

ASTRONAUTICS For related information see also *Aeronautics*.

12 ASTRONAUTICS (GENERAL)	N.A.
For extraterrestrial exploration see <i>91 Lunar and Planetary Exploration</i> .	
13 ASTRODYNAMICS	N.A.
Includes powered and free-flight trajectories; and orbital and launching dynamics.	
14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)	N.A.
Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators. For related information see also <i>09 Research and Support Facilities (Air)</i> .	
15 LAUNCH VEHICLES AND SPACE VEHICLES	N.A.
Includes boosters; operating problems of launch/space vehicle systems; and reusable vehicles. For related information see also <i>20 Spacecraft Propulsion and Power</i> .	
16 SPACE TRANSPORTATION	N.A.
Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques. For related information see also <i>03 Air Transportation and Safety</i> and <i>18 Spacecraft Design, Testing and Performance</i> . For space suits see <i>54 Man/System Technology and Life Support</i> .	
17 SPACE COMMUNICATIONS, SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING	3
Includes telemetry; space communications networks; astronavigation and guidance; and radio blackout. For related information see also <i>04 Aircraft Communications and Navigation</i> and <i>32 Communications and Radar</i> .	

N.A. — no abstracts were assigned to this category for this issue.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE 4
Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls. For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance*, *39 Structural Mechanics*, and *16 Space Transportation*.

19 SPACECRAFT INSTRUMENTATION 5
For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

20 SPACECRAFT PROPULSION AND POWER N.A.
Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources. For related information see also *07 Aircraft Propulsion and Power*, *28 Propellants and Fuels*, *44 Energy Production and Conversion*, and *15 Launch Vehicles and Space Vehicles*.

CHEMISTRY AND MATERIALS

23 CHEMISTRY AND MATERIALS (GENERAL) 5

24 COMPOSITE MATERIALS 6
Includes physical, chemical, and mechanical properties of laminates and other composite materials. For ceramic materials see *27 Nonmetallic Materials*.

25 INORGANIC AND PHYSICAL CHEMISTRY 8
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry. For related information see also *77 Thermodynamics and Statistical Physics*.

26 METALLIC MATERIALS 8
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS 9
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials. For composite materials see *24 Composite Materials*.

28 PROPELLANTS AND FUELS 11
Includes rocket propellants, igniters and oxidizers; their storage and handling procedures; and aircraft fuels. For related information see also *07 Aircraft Propulsion and Power*, *20 Spacecraft Propulsion and Power*, and *44 Energy Production and Conversion*.

29 MATERIALS PROCESSING 12
Includes space-based development of products and processes for commercial application. For biological materials see *55 Space Biology*.

ENGINEERING For related information see also *Physics*.

31 ENGINEERING (GENERAL) 12
Includes vacuum technology; control engineering; display engineering; cryogenics; and fire prevention.

32 COMMUNICATIONS AND RADAR 14
Includes radar; land and global communications; communications theory; and optical communications. For related information see also *04 Aircraft Communications and Navigation* and *17 Space Communications, Spacecraft Communications, Command and Tracking*. For search and rescue see *03 Air Transportation and Safety*, and *16 Space Transportation*.

33 ELECTRONICS AND ELECTRICAL ENGINEERING 15
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry. For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

34 FLUID MECHANICS AND HEAT TRANSFER 18
Includes boundary layers; hydrodynamics; fluidics; mass transfer and ablation cooling. For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.

35 INSTRUMENTATION AND PHOTOGRAPHY 19
Includes remote sensors; measuring instruments and gauges; detectors; cameras and photographic supplies; and holography. For aerial photography see *43 Earth Resources and Remote Sensing*. For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation*.

36 LASERS AND MASERS 25
Includes parametric amplifiers. For related information see also *76 Solid-State Physics*.

37 MECHANICAL ENGINEERING	25
Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.	
38 QUALITY ASSURANCE AND RELIABILITY	N.A.
Includes product sampling procedures and techniques; and quality control.	
39 STRUCTURAL MECHANICS	31
Includes structural element design and weight analysis; fatigue; and thermal stress. For applications see <i>05 Aircraft Design, Testing and Performance</i> and <i>18 Spacecraft Design, Testing and Performance</i> .	
GEOSCIENCES For related information see also <i>Space Sciences</i> .	
42 GEOSCIENCES (GENERAL)	N.A.
43 EARTH RESOURCES AND REMOTE SENSING	32
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography. For instrumentation see <i>35 Instrumentation and Photography</i> .	
44 ENERGY PRODUCTION AND CONVERSION	32
Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower. For related information see also <i>07 Aircraft Propulsion and Power</i> , <i>20 Spacecraft Propulsion and Power</i> , and <i>28 Propellants and Fuels</i> .	
45 ENVIRONMENT POLLUTION	33
Includes atmospheric, noise, thermal, and water pollution.	
46 GEOPHYSICS	N.A.
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism. For space radiation see <i>93 Space Radiation</i> .	
47 METEOROLOGY AND CLIMATOLOGY	33
Includes weather forecasting and modification.	
48 OCEANOGRAPHY	N.A.
Includes biological, dynamic, and physical oceanography; and marine resources. For related information see also <i>43 Earth Resources and Remote Sensing</i> .	
LIFE SCIENCES	
51 LIFE SCIENCES (GENERAL)	34
52 AEROSPACE MEDICINE	35
Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.	
53 BEHAVIORAL SCIENCES	N.A.
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.	
54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT	35
Includes human engineering; biotechnology; and space suits and protective clothing. For related information see also <i>16 Space Transportation</i> .	
55 SPACE BIOLOGY	N.A.
Includes exobiology; planetary biology; and extraterrestrial life.	
MATHEMATICAL AND COMPUTER SCIENCES	
59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)	N.A.
60 COMPUTER OPERATIONS AND HARDWARE	37
Includes hardware for computer graphics, firmware, and data processing. For components see <i>33 Electronics and Electrical Engineering</i> .	
61 COMPUTER PROGRAMMING AND SOFTWARE	37
Includes computer programs, routines, algorithms, and specific applications, e.g., CAD/CAM.	
62 COMPUTER SYSTEMS	38
Includes computer networks and special application computer systems.	

63 CYBERNETICS	39
Includes feedback and control theory, artificial intelligence, robotics and expert systems. For related information see also <i>54 Man/System Technology and Life Support</i> .	
64 NUMERICAL ANALYSIS	N.A.
Includes iteration, difference equations, and numerical approximation.	
65 STATISTICS AND PROBABILITY	N.A.
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.	
66 SYSTEMS ANALYSIS	N.A.
Includes mathematical modeling; network analysis; and operations research.	
67 THEORETICAL MATHEMATICS	N.A.
Includes topology and number theory.	
PHYSICS For related information see also <i>Engineering</i> .	
70 PHYSICS (GENERAL)	N.A.
For precision time and time interval (PTTI) see <i>35 Instrumentation and Photography</i> ; for geophysics, astrophysics or solar physics see <i>46 Geophysics</i> , <i>90 Astrophysics</i> , or <i>92 Solar Physics</i> .	
71 ACOUSTICS	39
Includes sound generation, transmission, and attenuation. For noise pollution see <i>45 Environment Pollution</i> .	
72 ATOMIC AND MOLECULAR PHYSICS	40
Includes atomic structure, electron properties, and molecular spectra.	
73 NUCLEAR AND HIGH-ENERGY PHYSICS	N.A.
Includes elementary and nuclear particles; and reactor theory. For space radiation see <i>93 Space Radiation</i> .	
74 OPTICS	40
Includes light phenomena and optical devices. For lasers see <i>36 Lasers and Masers</i> .	
75 PLASMA PHYSICS	N.A.
Includes magnetohydrodynamics and plasma fusion. For ionospheric plasmas see <i>46 Geophysics</i> . For space plasmas see <i>90 Astrophysics</i> .	
76 SOLID-STATE PHYSICS	43
Includes superconductivity. For related information see also <i>33 Electronics and Electrical Engineering</i> and <i>36 Lasers and Masers</i> .	
77 THERMODYNAMICS AND STATISTICAL PHYSICS	N.A.
Includes quantum mechanics; theoretical physics; and Bose and Fermi statistics. For related information see also <i>25 Inorganic and Physical Chemistry</i> and <i>34 Fluid Mechanics and Heat Transfer</i> .	
SOCIAL SCIENCES	
80 SOCIAL SCIENCES (GENERAL)	N.A.
Includes educational matters.	
81 ADMINISTRATION AND MANAGEMENT	N.A.
Includes management planning and research.	
82 DOCUMENTATION AND INFORMATION SCIENCE	N.A.
Includes information management; information storage and retrieval technology; technical writing; graphic arts; and micrography. For computer documentation see <i>61 Computer Programming and Software</i> .	
83 ECONOMICS AND COST ANALYSIS	N.A.
Includes cost effectiveness studies.	
84 LAW, POLITICAL SCIENCE AND SPACE POLICY	N.A.
Includes NASA appropriation hearings; aviation law; space law and policy; international law; international cooperation; and patent policy.	
85 URBAN TECHNOLOGY AND TRANSPORTATION	N.A.
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation. For related information see <i>03 Air Transportation and Safety</i> , <i>16 Space Transportation</i> , and <i>44 Energy Production and Conversion</i> .	

SPACE SCIENCES For related information see also *Geosciences*.

- 88 SPACE SCIENCES (GENERAL)** N.A.
- 89 ASTRONOMY** 45
Includes radio, gamma-ray, and infrared astronomy; and astrometry.
- 90 ASTROPHYSICS** N.A.
Includes cosmology; celestial mechanics; space plasmas; and interstellar and interplanetary gases and dust.
For related information see also *75 Plasma Physics*.
- 91 LUNAR AND PLANETARY EXPLORATION** N.A.
Includes planetology; and manned and unmanned flights. For spacecraft design or space stations see *18 Spacecraft Design, Testing and Performance*.
- 92 SOLAR PHYSICS** N.A.
Includes solar activity, solar flares, solar radiation and sunspots. For related information see *93 Space Radiation*.
- 93 SPACE RADIATION** N.A.
Includes cosmic radiation; and inner and outer earth's radiation belts. For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

GENERAL

Includes aeronautical, astronautical, and space science related histories, biographies, and pertinent reports too broad for categorization; histories or broad overviews of NASA programs.

- 99 GENERAL** N.A.

Section 2 • Indexes

SUBJECT INDEX

INVENTOR INDEX

SOURCE INDEX

CONTRACT NUMBER INDEX

NUMBER INDEX

ACCESSION NUMBER INDEX

NASA Patent Abstracts Bibliography

A Semiannual Publication of the National Aeronautics and Space Administration

02

AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

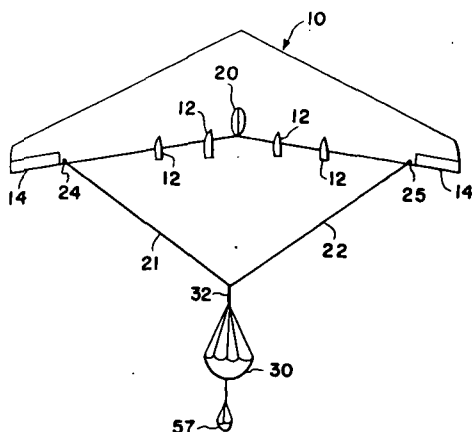
N91-15138* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

SELECTABLE TOWLINE SPIN CHUTE SYSTEM Patent Application

DANIEL M. VAIRO, inventor (to NASA) (Lockheed Engineering and Sciences Co., Hampton, VA.) and RAYMOND D. WHIPPLE, inventor (to NASA) 25 Oct. 1990 22 p
(NASA-CASE-LAR-14322-1; NAS 1.71:LAR-14322-1;
US-PATENT-APPL-SN-603335) Avail: NTIS HC/MF A03 CSCL 01A

An emergency spin recovery parachute is housed within a centrally mounted housing on the aft end of an aircraft and is connected to a ring fitting within the housing. Two selectively latching shackles, connected to separate towlines are openly disposed adjacent the ring fitting. The towlines extend in opposite directions from the housing along the aircraft wing to attachment points adjacent the wing-tips, where the other end of each towline is secured. Upon pilot command, one of the open shackles latches to the ring fitting to attach the towline connected thereto, and a second command signal deploys the parachute. Suitable break-away straps secure the towlines to the aircraft surface until the parachute is deployed and the resulting force on the towline attached to the parachute overcomes the straps and permits the towline to extend to the point of attachment to exert sufficient drag on the spinning aircraft to permit the pilot to regain control of the aircraft. To employ the parachute as a drag chute to reduce landing speeds, both shackles and their respective towlines are latched to the ring fitting.

NASA



N91-16999* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

MULTI-COLORED LAYERS FOR VISUALIZING AERODYNAMIC FLOW EFFECTS Patent Application

RONALD N. JENSEN, inventor (to NASA) 3 Dec. 1990 7 p

(NASA-CASE-LAR-13742-1; NAS 1.71:LAR-13742-1;
US-PATENT-APPL-SN-621144) Avail: NTIS HC/MF A02 CSCL 01A

A method is provided for visualizing aerodynamic flow effects on a test surface. First, discrete quantities of a sublimating chemical such as naphthalene are distinctively colored via appropriate dyes or paints. Next, a uniform layer of the sublimating chemical having a particular color is applied to the test surface. This layer is covered with a second uniform layer of a different colored sublimating chemical, and so on until a composite of multi-colored layers is formed having a discrete thickness. Friction caused by an airflow results in the distinctly colored layers being removed in proportion to such aerodynamic flow characteristics as velocity and temperature, resulting in a multi-colored portrait which approximates the air flow on the underlying test surface.

NASA

03

AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

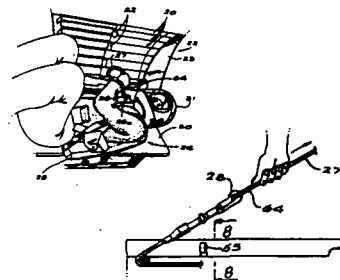
N91-15142* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

EMERGENCY EGRESS FIXED ROCKET PACKAGE Patent

MARGARET A. ALLEN, inventor (to NASA) (Rockwell International Corp., Houston, TX.) 29 Aug. 1989 8 p Filed 9 Sep. 1988
(NASA-CASE-MS-C-21332-1; US-PATENT-4,860,971;
US-PATENT-APPL-SN-242253; US-PATENT-CLASS-244-122AD;
US-PATENT-CLASS-89-1.34; US-PATENT-CLASS-42-1.13;
US-PATENT-CLASS-102-262; US-PATENT-CLASS-244-137.2;
US-PATENT-CLASS-244-162; INT-PATENT-CLASS-B64D-25/08)
Avail: US Patent and Trademark Office CSCL 01C

A method of effecting the in-flight departure of an astronaut from a shuttle craft, and apparatus is presented. A plurality of removeable compartment covers are provided, behind which rocket assemblies are stowed. To actuate the system, the astronaut pulls off a tab from one of the compartments which exposes a cannister having a lanyard with a hook. The lanyard extends around a spring biased sleeve with a safety lever preventing rocket ignition until the hook is moved by the astronaut. Upward movement of the hook allows the trigger mechanism to actuate the system resulting in the rods projecting out of the hatch. When the lanyard becomes taut, a lanyard elongation detector transmits a signal to the firing mechanisms to fire the rocket.

Official Gazette of the U.S. Patent and Trademark Office



AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

N91-14321* National Aeronautics and Space Administration. Pasadena Office, CA.

EFFICIENT DETECTION AND SIGNAL PARAMETER ESTIMATION WITH APPLICATION TO HIGH DYNAMIC GPS RECEIVER Patent

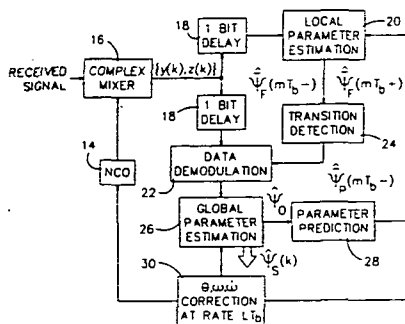
RAJENDRA KUMAR, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 25 Sep. 1990 11 p Filed 31 Oct. 1989

(NASA-CASE-NPO-17820-1-CU; US-PATENT-4,959,656; US-PATENT-APPL-SN-429734; US-PATENT-CLASS-342-418; US-PATENT-CLASS-342-352; US-PATENT-CLASS-342-357; US-PATENT-CLASS-329-306; US-PATENT-CLASS-375-80; US-PATENT-CLASS-375-94; INT-PATENT-CLASS-G01S-5/02)

Avail: US Patent and Trademark Office CSCL 17G

In a system for deriving position, velocity, and acceleration information from a received signal emitted from an object to be tracked wherein the signal comprises a carrier signal phase modulated by unknown binary data and experiencing very high Doppler and Doppler rate, this invention provides combined estimation/detection apparatus for simultaneously detecting data bits and obtaining estimates of signal parameters such as carrier phase and frequency related to receiver dynamics in a sequential manner. There is a first stage for obtaining estimates of the signal parameters related to phase and frequency in the vicinity of possible data transitions on the basis of measurements obtained within a current data bit. A second stage uses the estimates from the first stage to decide whether or not a data transition has actually occurred. There is a third stage for removing data modulation from the received signal when a data transition has occurred and a fourth stage for using the received signal with data modulation removed therefrom to update global parameters which are dependent only upon receiver dynamics and independent of data modulation. Finally, there is a fifth stage for using the global parameters to determine the position, velocity, and acceleration of the object.

Official Gazette of the U.S. Patent and Trademark Office



AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

N91-14345* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

WINGTIP VORTEX TURBINE Patent

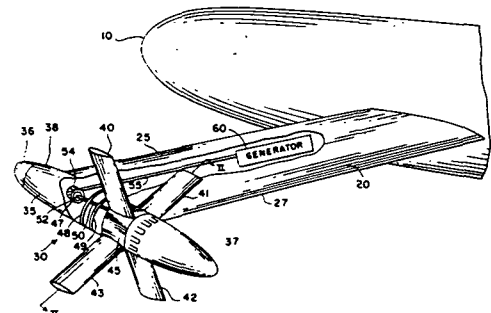
JAMES C. PATTERSON, JR., inventor (to NASA) 17 Apr. 1990 7 p Filed 28 Oct. 1988 Continuation-in-part of abandoned US-Patent-Appl-SN-004304, filed 5 Jan. 1987 which is a continuation-in-part of abandoned US-Patent-Appl-SN-243685, filed 16 Mar. 1981

(NASA-CASE-LAR-14116-1; US-PATENT-4,917,332; US-PATENT-APPL-SN-264993; US-PATENT-APPL-SN-004304; US-PATENT-APPL-SN-243685; US-PATENT-CLASS-244-58; US-PATENT-CLASS-244-199; US-PATENT-CLASS-290-44; US-PATENT-CLASS-290-55; INT-PATENT-CLASS-B64D-33/00)

Avail: US Patent and Trademark Office CSCL 01C

A means for extracting rotational energy from the vortex created at aircraft wing tips which consists of a turbine with blades located in the crossflow of the vortex and attached downstream of the wingtip. The turbine has blades attached to a core. When the aircraft is in motion, rotation of a core transmits energy to a centrally attached shaft. The rotational energy thus generated may be put to use within the airfoil or aircraft fuselage.

Official Gazette of the U.S. Patent and Trademark Office



RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tubes; and aircraft engine test stands.

N91-14356* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

ELECTRO-OPTICAL SPIN MEASUREMENT SYSTEM Patent

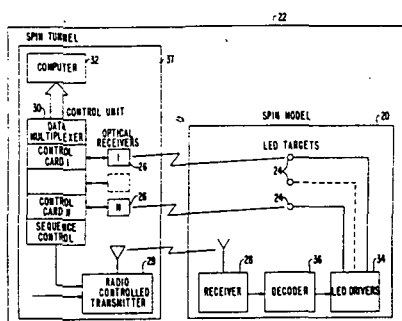
ROBERT FODALE, inventor (to NASA) and HERBERT R. HAMPTON, inventor (to NASA) 12 Jun. 1990 7 p Filed 30 Sep. 1988

(NASA-CASE-LAR-13629-1; US-PATENT-4,932,777; US-PATENT-APPL-SN-251411; US-PATENT-CLASS-356-152; US-PATENT-CLASS-33-263; US-PATENT-CLASS-73-147; US-PATENT-CLASS-342-54; US-PATENT-CLASS-356-1; US-PATENT-CLASS-356-141; US-PATENT-CLASS-364-433)

Avail: US Patent and Trademark Office CSCL 14B

An electro-optical spin measurement system for a spin model in a spin tunnel includes a radio controlled receiver/transmitter, targets located on the spin model, optical receivers mounted around the perimeter of the spin tunnel and the base of the spin tunnel for receiving data from the targets, and a control system for accumulating data from the radio controlled receiver and receivers. Six targets are employed. The spin model includes a fuselage, wings, nose, and tail. Two targets are located under the fuselage of the spin model at the nose tip and tail. Two targets are located on the side of the fuselage at the nose tip and tail, and a target is located under each wing tip. The targets under the fuselage at the nose tip and tail measure spin rate of the spin model, targets on the side of the fuselage at the nose tip and tail measure angle of attack of the spin model, and the targets under the wing tips measure roll angle of the spin model. Optical receivers are mounted at 90 degree increments around the periphery of the spin tunnel to determine angle of attack and roll angle measurements of the spin model. Optical receivers are also mounted at the base of the spin tunnel to define quadrant and position of the spin model and to determine the spin rate of the spin model.

Official Gazette of the U.S. Patent and Trademark Office



N91-14357* National Aeronautics and Space Administration. Ames Research Center. Moffett Field, CA.

WIND TUNNEL BALANCE Patent

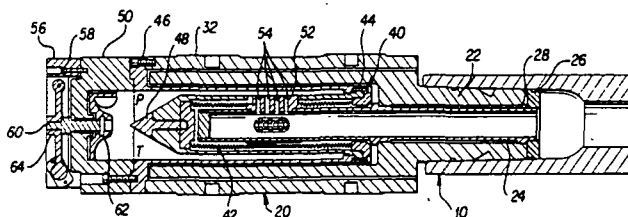
WARREN L. HORNE, inventor (to NASA), NANS KUNZ, inventor (to NASA), PHILLIP M. LUNA, inventor (to NASA), ANDREW C. ROBERTS, inventor (to NASA), KENNETH M. SMITH, inventor (to NASA), and RONALD C. SMITH, inventor (to NASA) 11 Jul. 1989 10 p. Filed 18 May 1988

(NASA-CASE-ARG-11877-1-SB; US-PATENT-4,845,993;
US-PATENT-APPL-SN-195563; US-PATENT-CLASS-73-147;
INT-PATENT-CLASS-G01M-9/00) Avail: US Patent and
Trademark Office CSCL 14B

A flow-through balance is provided which includes a non-metric portion and a metric portion which form a fluid-conducting passage in fluid communication with an internal bore in the sting. The non-metric and metric portions of the balance are integrally connected together by a plurality of flexure beams such that the non-metric portion, the metric portion and the flexure beams form a one-piece construction which eliminates mechanical hysteresis between the non-metric and the metric portion. The system includes structures for preventing the effects of temperature, pressure and pressurized fluid from producing asymmetric loads on the flexure beams. A temperature sensor and a pressure sensor are located within the fluid-conducting passage of the balance. The system includes a longitudinal bellows member connected at two ends to one of the non-metric portion and the metric portion and at an intermediate portion thereof to the other of (1) and (2). A plurality of strain gages are mounted on the flexure beams to measure strain forces on the flexure beams. The flexure beams are disposed

so as to enable symmetric forces on the flexure beams to cancel out so that only asymmetric forces are measured as deviations by the strain gages.

Official Gazette of the U.S. Patent and Trademark Office



17

SPACE COMM., SPACECRAFT COMM., COMMAND & TRACKING

Includes telemetry; space communications networks; astronavigation and guidance; and radio blackout.

N91-14371* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

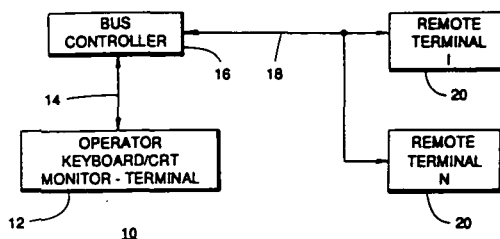
ADAPTIVE DATA ACQUISITION MULTIPLEXING SYSTEM AND METHOD Patent

RICHARD L. SINDERSON, inventor (to NASA), GEORGE A. SALAZAR, inventor (to NASA), CLYDE M. HADDICK, JR., inventor (to NASA), CAROLL J. SPAHN, inventor (to NASA), and CHIKKABELARANGALA N. VENKATESH, inventor (to NASA) (Lockheed Engineering and Management Services Co., Inc., Houston, TX.) 27 Nov. 1990 10 p Filed 15 Apr. 1988 (NASA-CASE-MSC-21170-1; US-PATENT-4,974,181; US-PATENT-APPL-SN-182266; US-PATENT-CLASS-364-550; US-PATENT-CLASS-324-115; US-PATENT-CLASS-364-487; INT-PATENT-CLASS-G06F-15/20) Avail: US Patent and Trademark Office CSCL 09F

A reconfigurable telemetry multiplexer is described which includes a monitor-terminal and a plurality of remote terminals. The remote terminals each include signal conditioning for a plurality of sensors for measuring parameters which are converted by an analog to digital converter. CPU's in the remote terminals store instructions for prompting system configuration and reconfiguration commands. The measurements, instructions, and the terminal's present configuration and status data are transmitted to the monitor-terminal and displayed. In response to menu-driven prompts generated and displayed at the monitor-terminal, data generation request commands, status and health commands, and the like are input at the monitor-terminal and transmitted to the remote terminals. The CPU in each remote terminal receives the various commands, stores them in electrically alterable memory, and reacts in accordance with the commands to reconfigure a plurality of aspects of the system. The CPU in each terminal also generates parameter measurements, status and health signals, and transmits these signals of the respective terminals to the monitor-terminal for low data rate operator viewing and to higher rate external transmission/monitor equipment. Reconfiguration may be in real time during the general period of parameter measurement acquisition, and may include alteration of the gain, automatic gain rescaling, bias, and or sampling rates associated with one or more

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

of the parameter measurements made by the remote terminals.
Official Gazette of the U.S. Patent and Trademark Office



18

SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls.

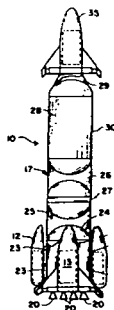
N91-13481*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

INTEGRATED LAUNCH AND EMERGENCY VEHICLE SYSTEM Patent Application

JAMES A. MARTIN, inventor (to NASA) 31 Aug. 1990 17 p (NASA-CASE-LAR-13780-1; NAS 1.71:LAR-13780-1; US-PATENT-APPL-SN-575737) Avail: NTIS HC/MF A03 CSCL 22B

A heavy launch vehicle is disclosed for placing a payload into a spatial earth orbit including an expendable, multi-container, propellant tank having a plurality of winged booster propulsion modules releasably disposed about one end thereof; and a payload supported by adapter structure at the other end. The preferred payload is an entry module adapted to be docked to a space station and used as a return vehicle for the space station crew, as scheduled, or in emergency situations. Alternately, the payload may include communication satellites, supplies, equipment and/or structural elements for the space station. The winged propulsion modules are released from the expendable propellant tank in pairs and return to Earth in a controlled glide, for safe landing at or near the launch site and prepared for reuse. The rocket engines for each propulsion module are dual-fuel, dual-mode engines and use methane-oxygen and hydrogen-oxygen, respectively, from the multi-containers of the propellant tank. When the propulsion modules are released from the expendable propellant tank, the rocket engines are pivotally moved into the module cargo bay for the return glide flight.

NASA



N91-13482*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

STANDARD REMOTE MANIPULATOR SYSTEM DOCKING TARGET AUGMENTATION FOR AUTOMATED DOCKING Patent Application

RICHARD DABNEY, inventor (to NASA), RICHARD HOWARD, inventor (to NASA), and THOMAS BRYAN, inventor (to NASA) 20 Feb. 1990 12 p (NASA-CASE-MFS-28419-1; NAS 1.71:MFS-28419-1; US-PATENT-APPL-SN-431538) Avail: NTIS HC/MF A03 CSCL 22B

A docking target is provided for use in automated docking of a first vehicle on which the target is located. The target comprising a pair of laterally extending arm portions lying in substantially the same plane and a central post extending outwardly from the plane of the arm portions. At least three reflectors are located on the target, two of the reflectors being located at the outboard ends of the arms portions and another reflector being located at the end of the central post. In an important embodiment, the reflectors comprise individual pieces of retroreflective tape. The reflectors, when viewed from the front of the target, are aligned along the longitudinal center line of the target, and can take a number of different shapes including circular or square.

NASA

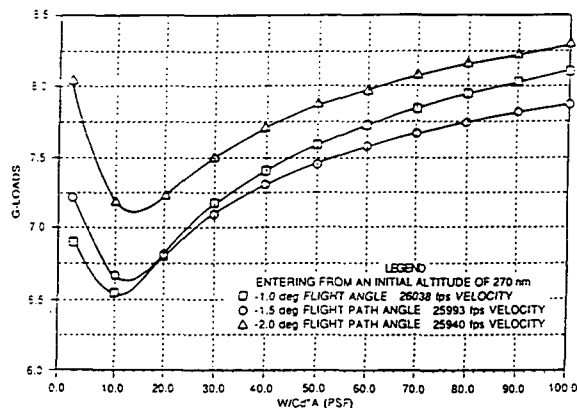
N91-13483*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

ASSURED CREW RETURN VEHICLE Patent Application

CHRISTOPHER J. CERIMELE, inventor (to NASA), ROBERT C. RIED, inventor (to NASA), WAYNE L. PETERSON, inventor (to NASA), GEORGE A. ZUPP, JR., inventor (to NASA), MICHAEL J. STAGNARO, inventor (to NASA), and BRIAN ROSS, inventor (to NASA) 28 Dec. 1989 87 p (NASA-CASE-MSC-21536-1; NAS 1.71:MSC-21536-1; US-PATENT-APPL-SN-458476) Avail: NTIS HC/MF A05

A return vehicle is disclosed for use in returning a crew to Earth from low earth orbit in a safe and relatively cost effective manner. The return vehicle comprises a cylindrically-shaped crew compartment attached to the large diameter of a conical heat shield having a spherically rounded nose. On-board inertial navigation and cold gas control systems are used together with a de-orbit propulsion system to effect a landing near a preferred site on the surface of the Earth. State vectors and attitude data are loaded from the attached orbiting craft just prior to separation of the return vehicle.

NASA



N91-14374* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

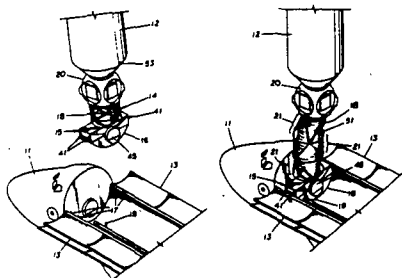
SMART TUNNEL: DOCKING MECHANISM Patent

JOHN A. SCHLIESING, inventor (to NASA) and KEVIN L. EDENBOROUGH, inventor (to NASA) 29 Aug. 1989 9 p Filed 30 Dec. 1988

(NASA-CASE-MSC-21360-1; US-PATENT-4,860,975; US-PATENT-APPL-SN-292131; US-PATENT-CLASS-244-161; US-PATENT-CLASS-405-188; US-PATENT-CLASS-14-71.5; US-PATENT-CLASS-244-137.2; INT-PATENT-CLASS-B64G-1/64) Avail: US Patent and Trademark Office CSCL 22B

A docking mechanism is presented for the docking of a space vehicle to a space station comprising a flexible tunnel frame structure which is deployable from the space station. The tunnel structure comprises a plurality of series connected frame sections, one end section of which is attached to the space station and the other end attached to a docking module of a configuration adapted for docking in the payload bay of the space vehicle. The docking module is provided with trunnions, adapted for latching engagement with latches installed in the vehicle payload bay and with hatch means connectable to a hatch of the crew cabin of the space vehicle. Each frame section comprises a pair of spaced ring members, interconnected by actuator-attenuator devices which are individually controllable by an automatic control means to impart relative movement of one ring member to the other in six degrees of freedom of motion. The control means includes computer logic responsive to sensor signals of range and attitude information, capture latch condition, structural loads, and actuator stroke for generating commands to the onboard flight control system and the individual actuator-attenuators to deploy the tunnel to effect a coupling with the space vehicle and space station after coupling. A tubular fluid-impervious liner, preferably fabric, is disposed through the frame sections of a size sufficient to accommodate the passage of personnel and cargo.

Official Gazette of the U.S. Patent and Trademark Office



19

SPACECRAFT INSTRUMENTATION

N91-14412* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

METHOD AND APPARATUS FOR DETERMINING TIME, DIRECTION, AND COMPOSITION OF IMPACTING SPACE PARTICLES Patent

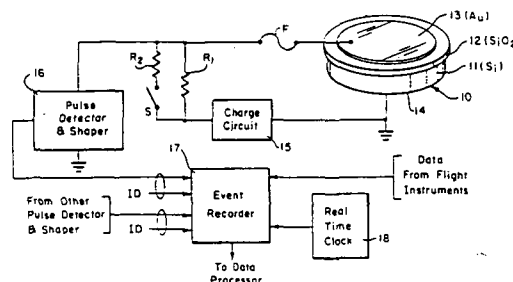
WILLIAM H. KINARD, inventor (to NASA), JIM J. WORTMAN, inventor (to NASA), PHILIP C. KASSEL, JR., inventor (to NASA), FRED S. SINGER, inventor (to NASA), DONALD H. HUMES, inventor (to NASA), and JOHN E. STANLEY, inventor (to NASA)

(Virginia Univ., Charlottesville.) 23 Oct. 1990 9 p Filed 21 Jun. 1989

(NASA-CASE-LAR-13392-1-CU; US-PATENT-4,964,300; US-PATENT-APPL-SN-369490; US-PATENT-CLASS-73-170R; INT-PATENT-CLASS-G01W-1/00) Avail: US Patent and Trademark Office CSCL 22B

A space particle collector for recording the time specific particles are captured, and its direction at the time of capture, utilizes an array of targets, each comprised of an MOS capacitor on a chip charged from an external source and discharged upon impact by a particle through a tab on the chip that serves as a fuse. Any impacting particle creates a crater, but only the first will cause a discharge of the capacitor. A substantial part of the metal film around the first crater is burned off by the discharge current. The time of the impulse which burns the tab, and the identification of the target, is recorded together with data from flight instruments. The metal film is partitioned into pie sections to provide a plurality of targets on each of an array of silicon wafers, thus increasing the total number of identified particles that can be collected. It is thus certain which particles were captured at what specific times.

Official Gazette of the U.S. Patent and Trademark Office



23

CHEMISTRY AND MATERIALS (GENERAL)

N91-14418* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

BIS (4-(3,4-DIMETHYLENE-PYRROLIDYL)-PHENYL) METHANE Patent

RAPHAEL M. OTTENBRITE, inventor (to NASA) (Virginia Commonwealth Univ., Richmond.) 23 Jan. 1990 4 p Filed 16 Feb. 1989 Division of US-Patent-Appl-SN-221386, filed 19 Jul. 1988

(NASA-CASE-LAR-13965-2-CU; US-PATENT-4,895,915; US-PATENT-APPL-SN-311551; US-PATENT-APPL-SN-221386; US-PATENT-CLASS-526-262; US-PATENT-CLASS-528-322; INT-PATENT-CLASS-C08G-73/10) Avail: US Patent and Trademark Office CSCL 07A

The primary objective is to prepare high temperature polymeric materials, especially linear aromatic polyimides, which maintain their integrity and toughness during long exposure times at elevated temperatures. The attained benefits are obtained by first providing the bis (exocyclodiene) bis (4-(3,4-dimethylene-pyrrolidyl)-phenyl) methane, which is a novel material formed from the monomer N-phenyl-3,4-dimethylene-pyrrolidine. This compound undergoes Diels-Alder reaction with a bismaleimide, without the evolution of gaseous by-products, to form the aromatic polyimide bis (4-(3,4-dimethylene-pyrrolidyl)-phenyl) methane.

Official Gazette of the U.S. Patent and Trademark Office

23 CHEMISTRY AND MATERIALS (GENERAL)

N91-14419* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

N-(3-ETHYNYLPHENYL)MALEIMIDE Patent

PAUL M. HERGENROTHER, inventor (to NASA), JOHN W. CONNELL, inventor (to NASA), and STEPHEN J. HAVENS, inventor (to NASA) 26 Jun. 1990 7 p Filed 10 Aug. 1989 Division of US-Patent-Appl-SN-328392, filed 24 Mar. 1989 which is a continuation-in-part of abandoned US-Patent-Appl-SN-087375, filed 20 Aug. 1987

(NASA-CASE-LAR-14188-2; US-PATENT-4,937,356; US-PATENT-APPL-SN-391692; US-PATENT-APPL-SN-328392; US-PATENT-APPL-SN-087375; US-PATENT-CLASS-548-549; INT-PATENT-CLASS-C07D-207/44) Avail: US Patent and Trademark Office CSDL 07A

Acetylene terminated aspartimides are prepared using two methods. In the first, an amino-substituted aromatic acetylene is reacted with an aromatic bismaleimide in a solvent of glacial acetic acid and/or m-cresol. In the second method, an aromatic diamine is reacted with an ethynyl containing maleimide, such as N-(3-ethynylphenyl) maleimide, in a solvent of glacial acetic acid and/or m-cresol. In addition, acetylene terminated aspartimides are blended with various acetylene terminated oligomers and polymers to yield composite materials exhibiting improved mechanical properties.

Official Gazette of the U.S. Patent and Trademark Office

N91-17141* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

SUBSTITUTED 1,1,1-TRIARYL-2,2,2-TRIFLUOROETHANES AND PROCESSES FOR THEIR SYNTHESIS Patent

WILLIAM B. ALSTON, inventor (to NASA) and ROY F. GRATZ, inventor (to NASA) 27 Mar. 1990 10 p Filed 30 Dec. 1988 Division of US-Patent-Appl-SN-159071, filed 23 Feb. 1988 which is a division of US-Patent-Appl-SN-924474, filed 29 Oct. 1986

(NASA-CASE-LEW-14345-3; US-PATENT-4,912,238; US-PATENT-APPL-SN-292049; US-PATENT-APPL-SN-159071; US-PATENT-APPL-SN-924474; US-PATENT-CLASS-552-101; INT-PATENT-CLASS-C07C-15/16) Avail: US Patent and Trademark Office CSDL 07A

Synthetic procedures to tetraalkyls, tetraacids and dianhydrides substituted 1,1,1 triaryl 2,2,2 trifluoroethanes which comprises: (1) 1,1 bis (dialkylaryl) 1 aryl 2,2,2 trifluoroethane, (2) 1,1 bis (dicarboxyaryl) 1 aryl 2,2,2 trifluoro ethane or (3) cyclic dianhydride of diamine of 1,1 bis (dialkylaryl) 1 aryl 2,2,2 trifluoro ethanes. The synthesis of (1) is accomplished by the condensation reaction of an aryltrifluoromethyl ketone with a dialkylaryl compound. The synthesis of (2) is accomplished by oxidation of (1). The synthesis of (3) is accomplished by the conversion of (2) to its corresponding cyclic dianhydride. The synthesis of the diamine is accomplished by the similar reaction of an aryltrifluoromethyl ketone with aniline or alkyl substituted or disubstituted anilines. Also, other derivatives of the above are formed by nucleophilic displacement reactions.

Official Gazette of the U.S. Patent and Trademark Office

24

COMPOSITE MATERIALS

Includes physical, chemical, and mechanical properties of laminates and other composite materials.

N91-13500*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

COMPOSITE THERMAL BARRIER COATING Patent

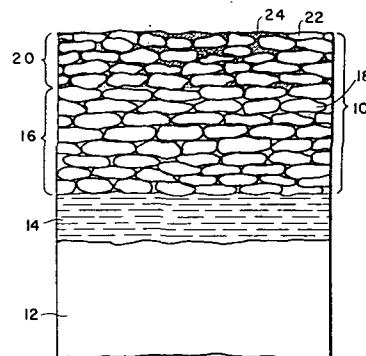
Application

SALVATORE J. GRISAFFE, inventor (to NASA) 31 Jul. 1990 12 p

(NASA-CASE-LEW-14999-1; NAS 1.71:LEW-14999-1; US-PATENT-APPL-SN-560926) Avail: NTIS HC/MF A03 CSDL 11D

A composite thermal barrier coating for a substrate has a first layer which includes a first ceramic material and a second layer which includes a second ceramic material impregnated with a glass, the glass being a ternary eutectic. The glass may consist of about 14.6 weight percent Al₂O₃, about 23.3 weight percent CaO, and about 62.1 weight percent SiO₂. The first and second ceramic materials may include yttria-stabilized zirconia.

NASA



N91-13502*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

METHOD OF MAKING SINGLE CRYSTAL FIBERS Patent

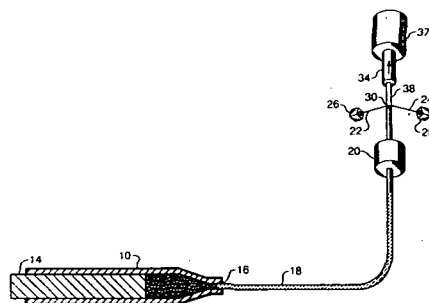
Application

LEONARD J. WESTFALL, inventor (to NASA) 23 Aug. 1990 12 p

(NASA-CASE-LEW-14921-1; NAS 1.71:LEW-14921-1; US-PATENT-APPL-SN-571059) Avail: NTIS HC/MF A03 CSDL 11D

Single crystal fibers are made from miniature extruded ceramic feed rods. A decomposable binder is mixed with powders to inform a slurry which is extruded into a small rod which may be sintered, either in air or in vacuum, or it may be used in the extruded and dried condition. A pair of laser beams focuses onto the tip of the rod to melt it thereby forming a liquid portion. A single crystal seed fiber of the same material as the feed rod contacts this liquid portion to establish a zone of liquid material between the feed rod and the single crystal seed fiber. The feed rod and the single crystal feed fiber are moved at a predetermined speed to solidify the molten zone onto the seed fiber while simultaneously melting additional feed rod. In this manner a single crystal fiber is formed from the liquid portion.

NASA



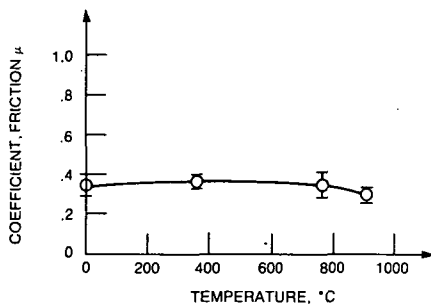
N91-13503* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

METHOD OF MAKING CARBIDE/FLUORIDE/SILVER COMPOSITES Patent Application

HAROLD E. SLINNEY, inventor (to NASA) and CHRISTOPHER DELLACORTE, inventor (to NASA) 23 Aug. 1990 10 p (NASA-CASE-LEW-14902-1; NAS 1.71:LEW-14902-1; US-PATENT-APPL-SN-571058) Avail: NTIS HC/MF A02 CSCL 11D

A composition containing 30 to 70 percent chromium carbide, 5 to 20 percent soft noble metal, 5 to 20 percent metal fluorides, and 20 to 60 percent metal binder is used in a powdered metallurgy process for the production of self-lubricating components, such as bearings. The use of the material allows the self-lubricating bearing to maintain its low friction properties over an extended range of operating temperatures.

NASA



N91-15320* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

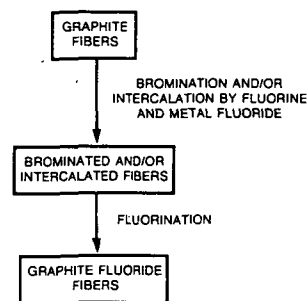
GRAPHITE FLUORIDE FIBER POLYMER COMPOSITE MATERIAL Patent

CHING-CHEH HUNG, inventor (to NASA) 18 Sep. 1990 5 p Filed 30 Sep. 1988

(NASA-CASE-LEW-14472-1; US-PATENT-4,957,661; US-PATENT-APPL-SN-251499; US-PATENT-CLASS-252-510; US-PATENT-CLASS-423-439; US-PATENT-CLASS-423-448; US-PATENT-CLASS-423-460; US-PATENT-CLASS-423-489; INT-PATENT-CLASS-H01B-1/06) Avail: US Patent and Trademark Office CSCL 11D

Improved graphite fluoride fibers are produced by contact reaction between highly graphitized fibers and fluorine gas. It is preferable to intercalate the fibers with bromine or fluorine and metal fluoride prior to fluorination. These graphite fluoride fibers are bound by an epoxy. The resulting composites have high thermal conductivity, high electric resistivity, and high emissivity.

Official Gazette of the U.S. Patent and Trademark Office



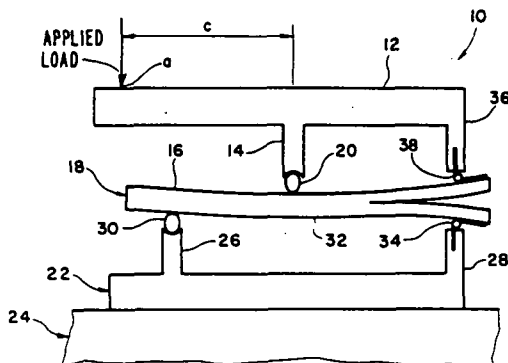
N91-14430* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

DELAMINATION TEST APPARATUS AND METHOD Patent

JOHN H. CREWS, JR., inventor (to NASA) and JAMES R. REEDER, inventor (to NASA) 22 May 1990 7 p Filed 28 Jul. 1989 (NASA-CASE-LAR-13985-1; US-PATENT-4,926,694; US-PATENT-APPL-SN-386172; US-PATENT-CLASS-73-794; INT-PATENT-CLASS-G01N-3/00) Avail: US Patent and Trademark Office CSCL 11D

A delamination test apparatus and method uses a single beam to simultaneously apply opening and shear stresses to a test specimen. A fulcrum extending downwardly from the beam produces shear stress in the specimen by downward movement, and opening stress by pivotal upward movement of the beam, which results by virtue of the fact that the applied load is on one side of the fulcrum while the test specimen is connected to the beam on the opposite side of the fulcrum.

Official Gazette of the U.S. Patent and Trademark Office



N91-15333* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

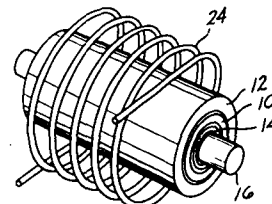
METHOD OF FABRICATING COMPOSITE STRUCTURES Patent Application

W. A. SIGUR, inventor (to NASA) (Martin Marietta Corp., New Orleans, LA.) 15 Sep. 1990 15 p

(NASA-CASE-MFS-28390-1; NAS 1.71:MFS-28390-1; US-PATENT-APPL-SN-578043) Avail: NTIS HC/MF A03 CSCL 11D

A method of fabricating structures formed from composite materials by positioning the structure about a high coefficient of thermal expansion material, wrapping a graphite fiber overwrap about the structure, and thereafter heating the assembly to expand the high coefficient of thermal expansion material to forcibly compress the composite structure against the restraint provided by the graphite overwrap. The high coefficient of thermal expansion material is disposed about a mandrel with a release system therebetween, and with a release system between the material having the high coefficient of thermal expansion and the composite material, and between the graphite fibers and the composite structure. The heating may occur by inducing heat into the assembly by a magnetic field created by coils disposed about the assembly through which alternating current flows. The method permits structures to be formed without the use of an autoclave.

NASA



24 COMPOSITE MATERIALS

N91-15334*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

CONTINUOUS FIBER THERMOPLASTIC PREPREG Patent Application

MAYWOOD L. WILSON, inventor (to NASA) and GARY S. JOHNSON, inventor (to NASA) 15 Nov. 1990 28 p (NASA-CASE-LAR-14459-1; NAS 1.71:LAR-14459-1; US-PATENT-APPL-SN-613046) Avail: NTIS HC/MF A03 CSCL 11D

A pultrusion machine employing a corrugated impregnator vessel to immerse multiple, continuous strand, fiber tow in an impregnating material, and an adjustable metered exit orifice for the impregnator vessel to control the quantity of impregnating material retained by the impregnated fibers, is provided. An adjustable height insert retains transverse rod elements within each depression of the corrugated vessel to maintain the individual fiber tows spread and in contact with the vessel bottom. A series of elongated heating dies, transversely disposed on the pultrusion machine and having flat heating surfaces with radiused edges, ensure adequate temperature exposed dwell time and exert adequate pressure on the impregnated fiber tows, to provide the desired thickness and fiber/resin ratio in the prepreg formed. The prepreg passing through the pulling mechanism is wound on a suitable take-up spool for subsequent use. A formula is derived for determining the cross sectional area opening of the metering device. A modification in the heating die system employs a heated nip roller in lieu of one of the pressure applying flat dies.

NASA

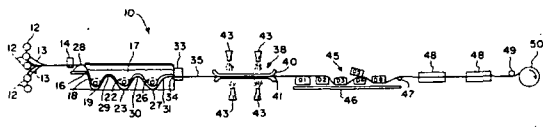


FIG. 1

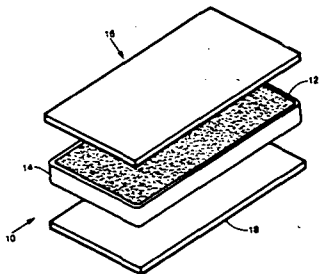
N91-17145* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

PROCESS FOR HIP CANNING OF COMPOSITES Patent

JOHN J. JUHAS, inventor (to NASA) 25 Dec. 1990 7 p Filed 9 Nov. 1989 Continuation-in-part of abandoned US-Patent-Appl-SN-326757, filed 21 Mar. 1989 (NASA-CASE-LEW-14990-1-CU; US-PATENT-4,980,126; US-PATENT-APPL-SN-433863; US-PATENT-APPL-SN-326757; US-PATENT-CLASS-419-49; US-PATENT-CLASS-419-8; US-PATENT-CLASS-419-24; US-PATENT-CLASS-419-36; US-PATENT-CLASS-419-37; US-PATENT-CLASS-419-48) Avail: US Patent and Trademark Office CSCL 11D

A single step is relied on in the canning process for hot isostatic pressing (HIP) metallurgy composites. The composites are made from arc sprayed and plasma sprayed monotape. The HIP can is of compatible refractory metal and is sealed at high vacuum and temperature. This eliminates outgassing during hot isostatic pressing.

Official Gazette of the U.S. Patent and Trademark Office



25

INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

N91-15368*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

METAL ETCHING COMPOSITION Patent Application

JOSEPH E. OTOUSA, inventor (to NASA), CLARK S. THOMAS, inventor (to NASA), and ROBERT E. FOSTER, inventor (to NASA) (Rockwell International Corp., Canoga Park, CA.) 25 Sep. 1990 15 p (NASA-CASE-MFS-29576-1; NAS 1.71:MFS-29576-1; US-PATENT-APPL-SN-587890) Avail: NTIS HC/MF A03 CSCL 07D

The present invention is directed to a chemical etching composition for etching composition for etching metals or metallic alloys. The composition includes a solution of hydrochloric acid, phosphoric acid, ethylene glycol, and an oxidizing agent. The etching composition is particularly useful for etching metal surfaces in preparation for subsequent fluorescent penetrant injection.

NASA



HEAT TREATED AND AGED

210 SECONDS

26

METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N91-13527*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

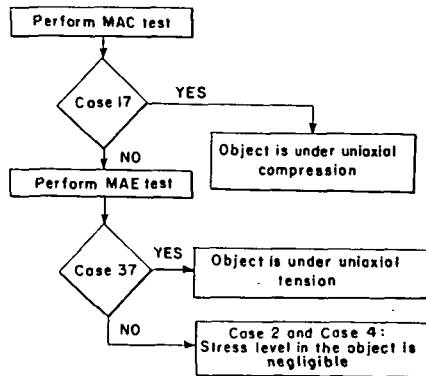
METHOD AND APPARATUS FOR CHARACTERIZING RESIDUAL STRESS IN FERROMAGNETIC MATERIALS Patent Application

MIN NAMKUNG, inventor (to NASA), WILLIAM T. YOST, inventor (to NASA), PETER W. KUSHNICK, inventor (to NASA), and JOHN L. GRAINGER, inventor (to NASA) (AS&M, Inc., Hampton, VA.) 23 Jul. 1990 25 p (NASA-CASE-LAR-14239-1; NAS 1.71:LAR-14239-1; US-PATENT-APPL-SN-555864) Avail: NTIS HC/MF A03 CSCL 11F

The invention is a method and apparatus for characterizing residual uniaxial stress in a ferromagnetic test member by distinguishing between residual stresses resulting from positive (tension) forces and negative (compression) forces by using the

distinct and known magnetoacoustic (MAC) and a magnetoacoustic emission (MAE) measurement circuit means. A switch permits the selective operation of the respective circuit means.

NASA



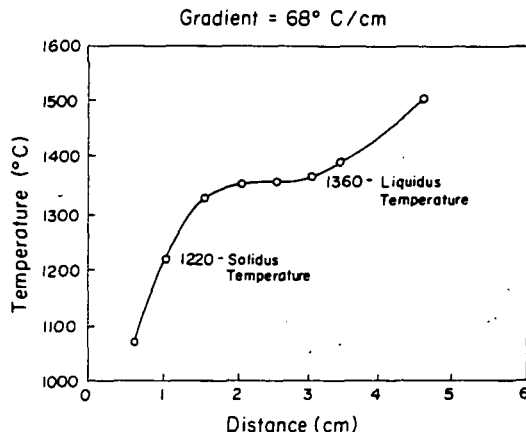
N91-14462* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

DIRECTIONAL SOLIDIFICATION OF SUPERALLOYS Patent

DEBORAH DIANE SCHMIDT, inventor (to NASA), WENDY SUE ALTER, inventor (to NASA), and WILLIAM DAVID HAMILTON, inventor (to NASA) 23 Oct. 1990 6 p Filed 7 Sep. 1989 (NASA-CASE-MFS-28314-1; US-PATENT-4,964,453; US-PATENT-APPL-SN-404289; US-PATENT-CLASS-164-122.1; US-PATENT-CLASS-164-338.1; INT-PATENT-CLASS-B22D-27/04) Avail: US Patent and Trademark Office CSCL 11F

This invention relates to the directional solidification of superalloys, in particular nickel-based superalloys, by imposition of a predetermined temperature profile in the solidification front and, depending on the desired results, a predetermined rate of advance of said solidification front, whereas castings of markedly superior fatigue resistance are produced.

Official Gazette of the U.S. Patent and Trademark Office



NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N91-13558*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

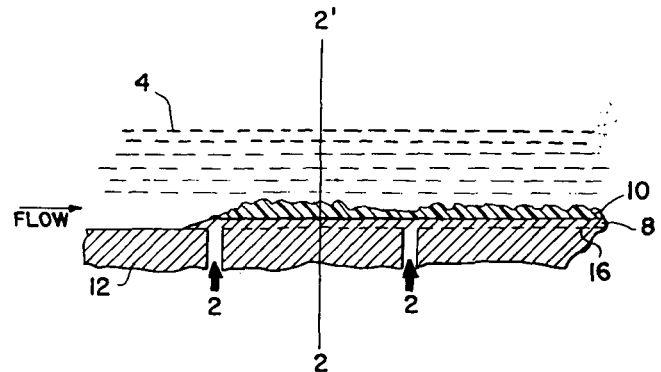
POLYMER/RIBLET COMBINATION FOR HYDRODYNAMIC SKIN FRICTION REDUCTION Patent Application

DENNIS M. BUSHNELL, inventor (to NASA) and JASON C. REED, inventor (to NASA) (Old Dominion Univ., Norfolk, VA.) 14 Aug. 1990 12 p

(NASA-CASE-LAR-14271-1-CU; NAS 1.71:LAR-14271-1-CU; US-PATENT-APPL-SN-567025) Avail: NTIS HC/MF A03 CSCL 11C

A process is disclosed for reducing skin friction and inhibiting the effects of liquid turbulence in a system involving the flow of a liquid along the surface of a body, e.g., a marine vehicle. This process includes injecting a drag reducing polymer into the valleys of adjacent, evenly spaced, longitudinal grooves extending along the length of the surface of the body, so that the rate of diffusion of the polymer from individual grooves into the liquid flow is predictably controlled by the groove dimensions. When the polymer has diffused over the tips of the grooves into the near wall region of the boundary layer, the polymer effectively reduces the turbulent skin friction. A substantial drag reducing effect is achieved with less polymer than must be used to lower skin friction when the surface of the body is smooth.

NASA



N91-13559*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

NOVEL POLYIMIDE MOLDING POWDER, COATING, ADHESIVE, AND MATRIX RESIN Patent Application

TERRY L. ST. CLAIR, inventor (to NASA) and DONALD J. PROGAR, inventor (to NASA) 31 Jul. 1990 16 p

(NASA-CASE-LAR-14163-1; NAS 1.71:LAR-14163-1; US-PATENT-APPL-SN-560717) Avail: NTIS HC/MF A03 CSCL 11C

The invention is a polyimide prepared from 3,4'-oxydianiline (3,4'-ODA) and 4,4'-oxydiphthalic anhydride (ODPA), in 2-methoxyethyl ether (diglyme). The polymer was prepared in ultra high molecular weight and in a controlled molecular weight form which has a 2.5 percent offset is stoichiometry (excess diamine) with a 5.0 percent level of phthalic anhydride as an endcap. This controlled molecular weight form allows for greatly improved processing of the polymer for moldings, adhesive bonding, and composite fabrication. The higher molecular weight version affords

27 NONMETALLIC MATERIALS

tougher films and coatings. The overall polymer structure groups in the dianhydride, the diamine, and a metal linkage in the diamine affords adequate flow properties for making this polymer useful as a molding powder, adhesive, and matrix resin.

NASA

N91-13560*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

PREPARATION OF POLYIMIDES FROM BIS(N-ISOPRENYL)S OF ARYL DIAMIDES Patent Application

JOSEPH G. SMITH, JR., inventor (to NASA) and RAPHAEL M. OTTENBRITE, inventor (to NASA) (Virginia Commonwealth Univ., Richmond.) 16 Aug. 1990 15 p
(NASA-CASE-LAR-14330-1-CU; NAS 1.71:LAR-14330-1-CU;
US-PATENT-APPL-SN-568128) Avail: NTIS HC/MF A03 CSCL 11C

A process and polyimide product formed by the reaction of a bismaleimide with a bis(amidediene) is disclosed wherein the bis(amidediene) is formed by reacting an excess of an acid chloride with 1,4-N,N'-diisoprenyl 2,3,5,6-tetramethyl benzene.

NASA

N91-13561*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

METHYL SUBSTITUTED POLYIMIDES CONTAINING CARBONYL AND ETHER CONNECTING GROUPS Patent Application

PAUL M. HERGENROTHER, inventor (to NASA) and STEVEN J. HAVENS, inventor (to NASA) (Lockheed Engineering and Sciences Co., Hampton, VA.) 28 Sep. 1990 19 p
(NASA-CASE-LAR-14351-1; NAS 1.71:LAR-14351-1;
US-PATENT-APPL-SN-589571) Avail: NTIS HC/MF A03 CSCL 11C

Polyimides were prepared from the reaction of aromatic dianhydrides with novel aromatic diamines having carbonyl and ether groups connecting aromatic rings containing pendant methyl groups. The methyl substituted polyimides exhibit good solubility and form tough, strong films. Upon exposure to ultraviolet irradiation and/or heat, the methyl substituted polyimides crosslink to become insoluble.

NASA

N91-13562*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

TISSUE SIMULATING GEL FOR MEDICAL RESEARCH Patent Application

JOHN A. COMPANION, inventor (to NASA) (PRC Kentron, Inc., Hampton, VA.) 6 Oct. 1989 10 p
(NASA-CASE-LAR-14036-1; NAS 1.71:LAR-14036-1;
US-PATENT-APPL-SN-418372) Avail: NTIS HC/MF A02 CSCL 11C

A tissue simulating gel and a method for preparing the tissue simulating gel are disclosed. The tissue simulating gel is prepared by a process using water, gelatin, ethylene glycol, and a cross-linking agent. In order to closely approximate the characteristics of the type of tissue being simulated, other material has been added to change the electrical, sound conducting, and wave scattering properties of the tissue simulating gel. The result of the entire process is a formulation that will not melt at the elevated temperatures involved in hyperthermia medical research. Furthermore, the tissue simulating gel will not support mold or

bacterial growth, is of a sufficient mechanical strength to maintain a desired shape without a supporting shell, and is non-hardening and non-drying. Substances were injected into the tissue simulating gel prior to the setting-up thereof just as they could be injected into actual tissue, and the tissue simulating gel is translucent so as to permit visual inspection of its interior. A polyurethane spray often used for coating circuit boards can be applied to the surface of the tissue simulating gel to give a texture similar to human skin, making the tissue simulating gel easier to handle and contributing to its longevity.

NASA

N91-13566*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

VINYL CAPPED ADDITION POLYIMIDES Patent Application

RAYMOND D. VANNUCCI, inventor (to NASA), DIANE C. MALARIK, inventor (to NASA), and PETER DELVIGS, inventor (to NASA) 25 Oct. 1990 14 p
(NASA-CASE-LEW-15027-1; NAS 1.71:LEW-15027-1;
US-PATENT-APPL-SN-603055) Avail: NTIS HC/MF A03 CSCL 11G

Polyimide resins having improved thermo-oxidative stability are provided having aromatic vinyl end-caps. The polyimides are prepared by the reaction of a mixture of monomers comprising (1) a diamine, (2) an ester of tetracarboxylic acid and (3) an aromatic vinyl compound in a molar ratio of 1:2:3 of n: (n + 1):2 when the aromatic vinyl compound contains nitrogen and in a ratio of (n + 1):n:2 when the aromatic vinyl compound does not contain nitrogen, wherein n ranges from about 5 to about 20.

NASA

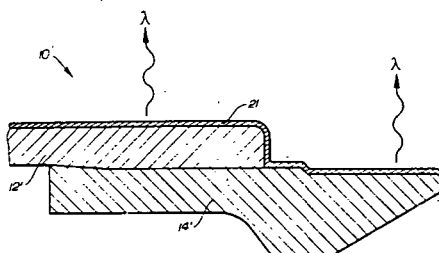
N91-14489* National Aeronautics and Space Administration. Pasadena Office, CA.

HIGH TEMPERATURE REFRACTORY MEMBER WITH RADIATION EMISSIVE OVERCOAT Patent

WILLIAM D. DEININGER, inventor (to NASA) and DAVID Q. KING, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 22 May 1990 6 p Filed 20 Aug. 1987
(NASA-CASE-NPO-17122-1-CU; US-PATENT-4,928,027;
US-PATENT-APPL-SN-087376; US-PATENT-CLASS-310-11;
INT-PATENT-CLASS-H02K-44/10) Avail: US Patent and Trademark Office CSCL 11C

A radiation type heat dissipator for use in a plasma engine is formed of a refractory metal layer upon which there is deposited a radiation emissive coating made of a high emissivity material such as zirconium diboride. The radiation emissive coating has a surface emissivity coefficient substantially greater than the emissivity coefficient of the refractory metal and thereby enhances the optical radiating efficiency of the heat dissipator.

Official Gazette of the U.S. Patent and Trademark Office



N91-15402* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

LADDER POLYMERS FOR USE AS HIGH TEMPERATURE STABLE RESINS OR COATINGS Patent

MARY ANN MEADOR, inventor (to NASA) 7 Aug. 1990 10 p Filed 11 Aug. 1988

(NASA-CASE-LEW-14203-1; US-PATENT-4,946,890; US-PATENT-APPL-SN-231026; US-PATENT-CLASS-524-600; US-PATENT-CLASS-525-436; US-PATENT-CLASS-528-353; INT-PATENT-CLASS-C08G-73/10) Avail: US Patent and Trademark Office CSCL 11C

An object of the invention is to synthesize a new class of ladder and partial ladder polymers. In accordance with the invention, the new class of ladder and partial ladder polymers are synthesized by polymerizing a bis-dienophile with a bis-diene. Another object of the invention is to provide a fabricated, electrically conducting, void free composite comprising the new class of the ladder and partial ladder polymers described above. The novelty of the invention relates to a new class of ladder and partial ladder polymers and a process for synthesizing these polymers. These polymers are soluble in common organic solvents and are characterized with a unique dehydration property at temperatures of 300 to 400 C to provide thermo-oxidatively stable pentyptcene units along the polymeric backbone. These polymers are further characterized with high softening points and good thermo-oxidative stability properties. Thus these polymers have potential as processable, matrix resins for high temperature composite applications.

Official Gazette of the U.S. Patent and Trademark Office

N91-15403* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

PROCESSABLE POLYIMIDE ADHESIVE AND MATRIX COMPOSITE RESIN Patent

J. RICHARD PRATT, inventor (to NASA), TERRY L. ST. CLAIR, inventor (to NASA), and DONALD J. PROGAR, inventor (to NASA) 26 Jun. 1990 6 p Filed 2 Nov. 1988

(NASA-CASE-LAR-14101-1; US-PATENT-4,937,317; US-PATENT-APPL-SN-266045; US-PATENT-CLASS-528-353; US-PATENT-CLASS-528-125; US-PATENT-CLASS-528-126; US-PATENT-CLASS-528-172; US-PATENT-CLASS-528-173; US-PATENT-CLASS-528-176; INT-PATENT-CLASS-C08G-69/26) Avail: US Patent and Trademark Office CSCL 11C

A high temperature polyimide composition prepared by reacting 4,4'-isophthaloyldiphthalic anhydride with metaphenylenediamine is employed to prepare matrix resins, adhesives, films, coatings, moldings, and laminates, especially those showing enhanced flow with retention of mechanical and adhesive properties. It can be used in the aerospace industry, for example, in joining metals to metals or metals to composite structures. One area of application is in the manufacture of lighter and stronger aircraft and spacecraft structures.

Official Gazette of the U.S. Patent and Trademark Office

N91-15412*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

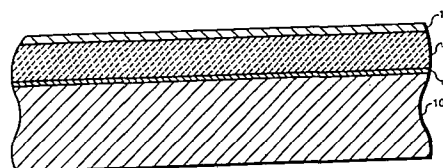
METALLIC SEAL FOR THERMAL BARRIER COATING SYSTEMS Patent Application

ROBERT A. MILLER, inventor (to NASA) 23 Oct. 1990 9 p (NASA-CASE-LEW-15020-1; NAS 1.71:LEW-15020-1; US-PATENT-APPL-SN-601957) Avail: NTIS HC/MF A02 CSCL 11C

The invention is particularly concerned with sealing thermal barrier coating systems of the type in use and being contemplated for use in diesel and other internal combustion engines. The

invention also would find application in moderately high temperature regions of gas turbine engines and any other application employing a thermal barrier coating at moderate temperatures. Ni-35Cr-6Al-1Y, Ni-35Cr-6Al-1Yb, or other metallic alloy denoted as MCrAlx is applied over a zirconia-based thermal barrier overlayer. The close-out layer is glass-bead preened to density its surface. This seals and protects the thermal barrier coating system.

NASA



N91-16152*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

METHOD OF MAKING CONTAMINATION-FREE CERAMIC BODIES Patent Application

WARREN H. PHILIPP, inventor (to NASA) 9 Nov. 1990 8 p (NASA-CASE-LEW-14984-1; NAS 1.71:LEW-14984-1; US-PATENT-APPL-SN-610883) Avail: NTIS HC/MF A02 CSCL 11C

Ceramic structures having high strength at temperatures above 1000 C after sintering are made by mixing ceramic powders with binder deflocculants such as guanidine salts of polymeric acids, guanidine salts of aliphatic organic carboxylic acids or guanidine alkylsulfates with the foregoing guanidine salts. The novelty of the invention appears to lie in the substitution of guanidine salts for the alkalai metal salts components or organic fatty acids of the prior art binder-deflocculant, ceramic processing aids whereby no undesirable metal contaminants are present in the final ceramic structure. Guanidine alkyl sulfates also replace the Na or K alkyl sulfates commonly used with binder-deflocculants in making high temperature ceramic structures.

NASA

PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; their storage and handling procedures; and aircraft fuels.

N91-14495* National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, FL.

LIQUID HYDROGEN POLYGENERATION SYSTEM AND PROCESS Patent

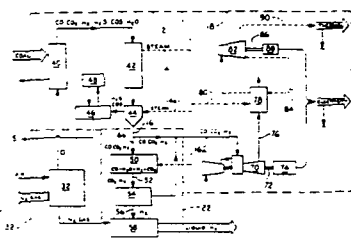
PETER A. MINDERMAN, inventor (to NASA), GARY P. GUTKOWSKI, inventor (to NASA), LAWRENCE MANFREDI, inventor (to NASA), JULIAN V. KING, inventor (to NASA), and FRANK S. HOWARD, inventor (to NASA) 26 Jun. 1990 9 p Filed 15 Nov. 1985 Continuation of abandoned

29 MATERIALS PROCESSING

US-Patent-Appl-SN-603375, filed 24 Apr. 1984
(NASA-CASE-KSC-11304-2; US-PATENT-4,936,869;
US-PATENT-APPL-SN-798713; US-PATENT-APPL-SN-603375;
US-PATENT-CLASS-48-77; US-PATENT-CLASS-48-197R;
US-PATENT-CLASS-48-203; US-PATENT-CLASS-60-39.12;
US-PATENT-CLASS-60-39.182; US-PATENT-CLASS-423-655)
Avail: US Patent and Trademark Office CSCL 21D

An integrated polygeneration system and process is disclosed for generating liquid hydrogen as a main energy product for use as a propellant for space vehicles. Secondary energy products and commodities for supporting a space center complex and launching of the space vehicle includes the production of electrical and thermal energy and gaseous nitrogen. The integrated process includes a coal gasification and gas cleanup system, a combined cycle power generation system, a hydrogen production and liquefaction system and an air separation system. A medium BTU gas is produced by the coal gasification system. Steam also produced in the coal gasification process is delivered to a steam turbine in the combined cycle power generation system.

Official Gazette of the U.S. Patent and Trademark Office



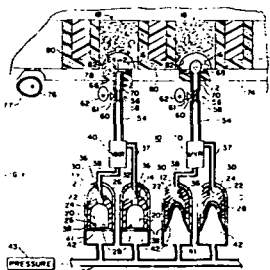
29

MATERIALS PROCESSING

Includes space-based development of products and processes for commercial applications.

N91-17250*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
DROP DEPLOYMENT SYSTEM FOR CRYSTAL GROWTH APPARATUS Patent Application
PERCY RHODES, inventor (to NASA), ROBERT S. SNYDER, inventor (to NASA), and MARC L. PUSEY, inventor (to NASA)
18 Dec. 1990 17 p
(NASA-CASE-MFS-28422-1; NAS 1.71:MFS-28422-1;
US-PATENT-APPL-SN-629740) Avail: NTIS HC/MF A03 CSCL 22A

A crystal growth apparatus is presented. It utilizes a vapor diffusion method for growing protein crystals, and particularly such an apparatus wherein a ball mixer is used to mix the fluids that form a drop within which crystals are grown. Particular novelty of this invention lies in utilizing a ball mixer to completely mix the precipitate and protein solutions prior to forming the drop. Additional novelty lies in details of construction of the vials, the fluid deployment system, and the fluid storage system of the preferred embodiment.



NASA

31

ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; cryogenics; and fire prevention.

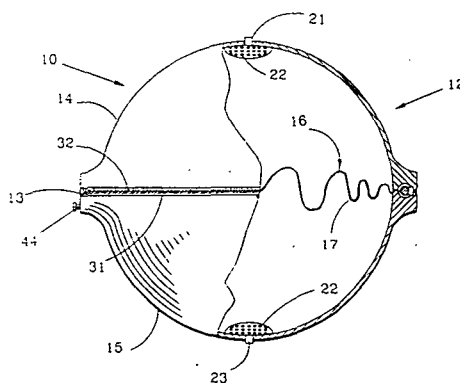
N91-13580*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

DUAL DIAPHRAGM TANK WITH TELLTALE DRAIN Patent Application

WALLACE C. TUTHILL, inventor (to NASA) 25 Oct. 1990 15 p
(NASA-CASE-MSC-21703-1; NAS 1.71:MSC-21703-1;
US-PATENT-APPL-SN-603052) Avail: NTIS HC/MF A03 CSCL 13B

A fluid storage and expulsion system comprising a tank with an internal flexible diaphragm assembly of dual diaphragms in back-to-back relationship, at least one of which is provided with a patterned surface having fine edges such that the diaphragms are in contact along said edges without mating contact of surface areas to thereby form fluid channels which extend outwardly to the peripheral edges of the diaphragms. The interior wall of the tank at the juncture of tank sections is formed with a circumferential annular recess comprising an outer annular recess portion which forms a fluid collection chamber and an inner annular recess portion which accommodates the peripheral edge portions of the diaphragms and a sealing ring in clamped sealing relation therebetween. The sealing ring is perforated with radially extending passages which allow any fluid leaking or diffusing past a diaphragm to flow through the fluid channels between the diaphragms to the fluid collection chamber. Ports connectable to pressure fittings are provided in the tank sections for admission of fluids to opposite sides of the diaphragm assembly. A drain passage through the tank wall to the fluid collection chamber permits detection, analysis and removal of fluids in the collection chamber.

NASA



N91-13581*# National Aeronautics and Space Administration. Pasadena Office, CA.

FLEXIBLE THERMAL APPARATUS FOR MOUNTING OF THERMOELECTRIC COOLER Patent Application

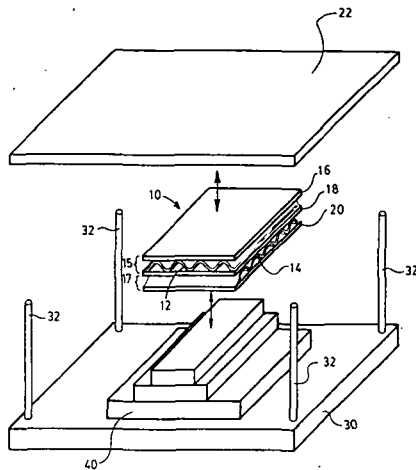
JACK A. JONES, inventor (to NASA), S. WALTER PETRICK, inventor (to NASA), and STEVEN BARD, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 31 Jul. 1990 10 p
(Contract NAS7-918)

(NASA-CASE-NPO-17806-1-CU; NAS 1.71:NPO-17806-1-CU;
US-PATENT-APPL-SN-560908) Avail: NTIS HC/MF A02 CSCL 13B

A flexible heat transfer apparatus used to flexibly connect and thermally couple a thermoelectric cooler to an object to be cooled

is disclosed. The flexible heat transfer apparatus consists of a pair of flexible corrugated sheets made from high thermal conductivity materials such as copper, aluminum, gold, or silver. The ridges of the corrugated sheets are oriented perpendicular to one another and bonded sandwich-fashion between three plates to define an upper section and a lower section. The upper section provides X flexure, the lower section provides Y flexure, and both sections together provide Z flexure.

NASA



N91-14508* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

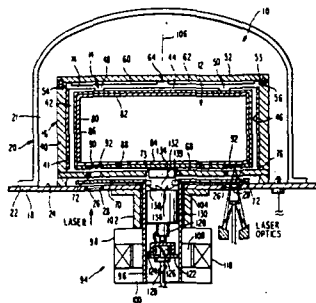
ELECTROSTATICALLY SUSPENDED ROTOR FOR ANGULAR ENCODER Patent

WALTER POLSTORFF, inventor (to NASA) 23 Oct. 1990 13 p Filed 21 Aug. 1989

(NASA-CASE-MFS-28294-1; US-PATENT-4,965,429; US-PATENT-APPL-SN-396262; US-PATENT-CLASS-219-121.68; INT-PATENT-CLASS-B23K-26/00) Avail: US Patent and Application Office CSCL 13B

An apparatus for engraving a code strip with coded markings is disclosed. The code strip is attached for rotation to a cylindrical rotor which is mounted within the cavity of a stator. The stator carries electrodes on its top and side walls to which high potentials are applied to electrostatically suspend the rotor. Circuit means sense the position of the rotor with respect to the stator electrodes and adjust the potential to maintain the rotor at its desired location. A drive motor is connected to the rotor through a drive shaft to initially lift the rotor into the desired location within the stator and to rotate it at the desired speed. Thereafter, the drive shaft is disconnected from the rotor, and the rotor continues to spin at a highly stable angular velocity, supported only by the electrostatic fields.

Official Gazette of the U.S. Patent and Trademark Office



N91-15423* National Aeronautics and Space Administration. Pasadena Office, CA.

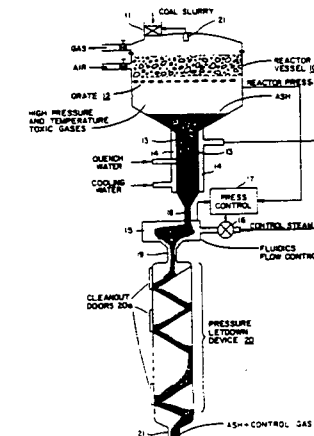
ENERGY EFFICIENT CONTINUOUS FLOW ASH LOCKHOPPER Patent

EARL R. COLLINS, JR., inventor (to NASA), JERRY W. SUITOR, inventor (to NASA), and DAVID DUBIS, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 29 Aug. 1989 9 p Filed 18 May 1988

(NASA-CASE-NPO-16985-1-CU; US-PATENT-4,860,669; US-PATENT-APPL-SN-195222; US-PATENT-CLASS-110-165R; US-PATENT-CLASS-110-171; US-PATENT-CLASS-110-259; US-PATENT-CLASS-414-217; US-PATENT-CLASS-414-220; INT-PATENT-CLASS-F23J-1/00) Avail: US Patent and Trademark Office CSCL 13B

The invention relates to an energy efficient continuous flow ash lockhopper, or other lockhopper for reactor product or byproduct. The invention includes an ash hopper at the outlet of a high temperature, high pressure reactor vessel containing heated high pressure gas, a fluidics control chamber having an input port connected to the ash hopper's output port and an output port connected to the input port of a pressure letdown means, and a control fluid supply for regulating the pressure in the control chamber to be equal to or greater than the internal gas pressure of the reactor vessel, whereby the reactor gas is contained while ash is permitted to continuously flow from the ash hopper's output port, impelled by gravity. The main novelty resides in the use of a control chamber to so control pressure under the lockhopper that gases will not exit from the reactor vessel, and to also regulate the ash flow rate. There is also novelty in the design of the ash lockhopper shown in two figures. The novelty there is the use of annular passages of progressively greater diameter, and rotating the center parts on a shaft, with the center part of each slightly offset from adjacent ones to better assure ash flow through the opening.

Official Gazette of the U.S. Patent and Trademark Office



N91-15424* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

LIQUID SHEET RADIATOR APPARATUS Patent

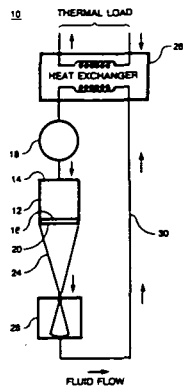
DONALD L. CHUBB, inventor (to NASA) 3 Apr. 1990 9 p Filed 15 Sep. 1988

(NASA-CASE-LEW-14295-1; US-PATENT-4,913,225; US-PATENT-APPL-SN-244377; US-PATENT-CLASS-165-104.31; US-PATENT-CLASS-165-41; US-PATENT-CLASS-165-904; US-PATENT-CLASS-239-597; US-PATENT-CLASS-239-601; US-PATENT-CLASS-244-163; INT-PATENT-CLASS-F8-15/00) Avail: US Patent and Trademark Office CSCL 13B

An external flow, liquid sheet radiator apparatus adapted for space applications has as its radiating surface a thin stable liquid sheet formed by fluid flow through a very narrow slit affixed to the sheet generator. As a result of surface tension forces, the sheet has a triangular shape and is collected into a simply designed collector positioned at the apex of the triangle. The specific power

32 COMMUNICATIONS AND RADAR

for the liquid sheet is virtually the same as the droplet sheet specific power.
Official Gazette of the U.S. Patent and Trademark Office



32

COMMUNICATIONS AND RADAR

Includes radar; land and global communications; communications theory; and optical communications.

N91-13594*# National Aeronautics and Space Administration. Pasadena Office, CA.
METHOD FOR PROVIDING A POLARIZATION FILTER FOR PROCESSING SYNTHETIC APERTURE RADAR IMAGE DATA
Patent Application
PASCALE C. DUBOIS, inventor (to NASA) and JAKOB J. VANZYL, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 25 Jun. 1990 27 p
(Contract NAS7-918)
(NASA-CASE-NPO-17904-1-CU; NAS 1.71:NPO-17904-1-CU; US-PATENT-APPL-SN-544293) Avail: NTIS HC/MF A03 CSCL 171

A polarization filter can maximize the signal-to-noise ratio of a polarimetric synthetic aperture radar (SAR) and help discriminate between targets or enhance image features, e.g., enhance contrast between different types of target. The method disclosed is based on the Stokes matrix/ Stokes vector representation, so the targets of interest can be extended targets, and the method can also be applied to the case of bistatic polarimetric radars.

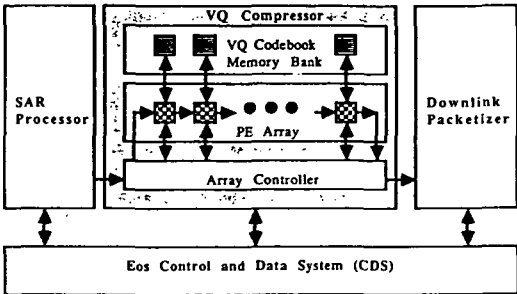
NASA

N91-13595*# National Aeronautics and Space Administration. Pasadena Office, CA.
PIPELINE SYNTHETIC APERTURE RADAR DATA COMPRESSION UTILIZING SYSTOLIC BINARY TREE-SEARCHED ARCHITECTURE FOR VECTOR QUANTIZATION
Patent Application
CHI-YUNG CHANG, inventor (to NASA), WAI-CHI FANG, inventor (to NASA), and JOHN C. CURLANDER, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 10 Jul. 1990 37 p
(Contract NAS7-918)
(NASA-CASE-NPO-17941-1-CU; NAS 1.71:NPO-17941-1-CU; US-PATENT-APPL-SN-550775) Avail: NTIS HC/MF A03 CSCL 171

A system for data compression utilizing systolic array

architecture for Vector Quantization (VQ) is disclosed for both full-searched and tree-searched. For a tree-searched VQ, the special case of a Binary Tree-Search VQ (BTSVQ) is disclosed with identical Processing Elements (PE) in the array for both a Raw-Codebook VQ (RCVQ) and a Difference-Codebook VQ (DCVQ) algorithm. A fault tolerant system is disclosed which allows a PE that has developed a fault to be bypassed in the array and replaced by a spare at the end of the array, with codebook memory assignment shifted one PE past the faulty PE of the array.

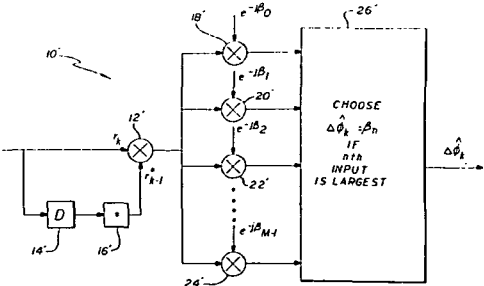
NASA



N91-13596*# National Aeronautics and Space Administration. Pasadena Office, CA.
MULTIPLE SYMBOL DIFFERENTIAL DETECTION
Patent Application
D. DIVSALAR, inventor (to NASA) and M. SIMON, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 31 Jul. 1990 24 p
(Contract NAS7-918)
(NASA-CASE-NPO-17896-1-CU; NAS 1.71:NPO-17896-1-CU; US-PATENT-APPL-SN-560691) Avail: NTIS HC/MF A03 CSCL 17B

A differential detection technique for multiple phase shift keying (MPSK) signals is provided which uses a multiple symbol observation interval on the basis of which a joint decision is made regarding the phase of the received symbols. In accordance with the invention, a first difference phase is created between first and second received symbols. Next the first difference phase is correlated with the possible values thereof to provide a first plurality of intermediate output signals. A second difference phase is next created between second and third received symbols. The second difference phase is correlated with plural possible values thereof to provide a second plurality of intermediate output signals. Next, a third difference phase is created between the first and third symbols. The third difference phase is correlated with plural possible values thereof to provide a third plurality of intermediate output signals. Each of the first plurality of intermediate outputs are combined with each of the second plurality of intermediate outputs and each of the third plurality of intermediate outputs to provide a plurality of possible output values. Finally, a joint decision is made by choosing from the plurality of possible output values the value which represents the best combined correlation of the first, second and third difference values with the possible values thereof.

NASA



N91-13598* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

REAL-TIME DATA COMPRESSION OF BROADCAST VIDEO SIGNALS Patent Application

MARY J. SHALKHAUSER, inventor (to NASA), WAYNE A. WHYTE, JR., inventor (to NASA), and SCOTT P. BARNES, inventor (to NASA) (Hughes Aircraft Co., Canoga Park, CA.) 20 Jun. 1990 56 p

(NASA-CASE-LEW-14945-1; NAS 1.71:LEW-14945-1; US-PATENT-APPL-SN-540976) Avail: NTIS HC/MF A04

A non-adaptive predictor, a nonuniform quantizer, and a multi-level Huffman coder are incorporated into a differential pulse code modulation system for coding and decoding broadcast video signals in real time.

NASA

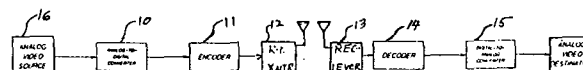
JR., inventor (to NASA), and SCOTT P. BARNES, inventor (to NASA) (Hughes Aircraft Co., Canoga Park, CA.) 9 Nov. 1990 55 p

(NASA-CASE-LEW-14945-2; NAS 1.71:LEW-14945-2;

US-PATENT-APPL-SN-611214) Avail: NTIS HC/MF A04 CSCL 17B

A non-adaptive predictor, a nonuniform quantizer and a multi-level Huffman coder are incorporated into a differential pulse code modulation system for coding and decoding broadcast video signals in real time.

NASA



N91-14523* National Aeronautics and Space Administration. Pasadena Office, CA.

TRELLIS CODED MODULATION FOR TRANSMISSION OVER FADING MOBILE SATELLITE CHANNEL Patent

MARVIN K. SIMON, inventor (to NASA) and DARIUSH DIVASALAR, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 3 Jul. 1990 21 p Filed 15 Sep. 1988 Continuation of abandoned US-Patent-Appl-SN-929876, filed 13 Nov. 1986

(NASA-CASE-NPO-16904-2-CU; US-PATENT-4,945,549;

US-PATENT-APPL-SN-246032; US-PATENT-APPL-SN-929876;

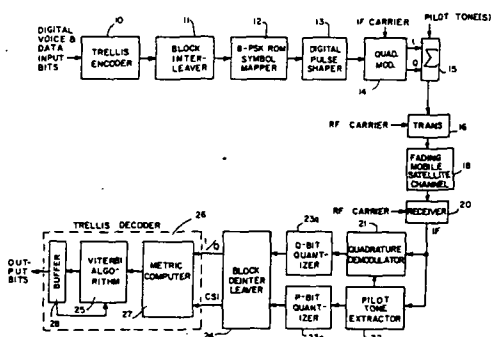
US-PATENT-CLASS-375-53; US-PATENT-CLASS-375-57;

US-PATENT-CLASS-371-43; INT-PATENT-CLASS-H04L-27/18)

Avail: US Patent and Trademark Office CSCL 17B

The combination of trellis coding and multiple phase-shift keyed (MPSK) signaling with asymmetry (nonuniform spacing) to the signal set is disclosed with regard to its suitability for a fading mobile satellite communication channel. For MPSK signaling, introducing nonuniformity in the phase spacing between signal points provides an improvement in performance over that achievable with trellis codes symmetric MPSK signaling, all this without increasing the average or peak power, or changing the bandwidth constraints imposed on the system. Block interleaving may be used to reduce error and pilot tone(s) may be used for improving the error correction performance of the trellis decoder in the presence of channel fading.

Official Gazette of the U.S. Patent and Trademark Office



N91-15469* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

REAL-TIME DATA COMPRESSION OF BROADCAST VIDEO SIGNALS Patent Application

MARY J. SHALKHAUSER, inventor (to NASA), WAYNE A. WHYTE,

33

ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

N91-13621* National Aeronautics and Space Administration. Pasadena Office, CA.

SECONDARY LI BATTERY INCORPORATING 12-CROWN-4 ETHER Patent Application

GANESAN NAGASUBRAMANIAN, inventor (to NASA) and SALVADOR DISTEFANO, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 11 Oct. 1990 16 p (Contract NAS7-918)

(NASA-CASE-NPO-17922-1-CU; NAS 1.71:NPO-17922-1-CU;

US-PATENT-APPL-SN-596139) Avail: NTIS HC/MF A03 CSCL 09A

A rechargeable lithium battery which utilizes a polyethylene oxide (PEO) solid polymeric electrolyte complexed with a lithium salt is disclosed. The conductivity is increased an order of magnitude and interfacial charge transfer resistance is substantially decreased by incorporating a minor amount of 12-Crown-4 ether in the PEO-lithium salt solid electrolyte film. Batteries containing the improved electrolyte permit operation at a lower temperature with improved efficiency.

NASA

N91-13622* National Aeronautics and Space Administration. Pasadena Office, CA.

DETECTION OF MULTIPLE-BIT ERRORS FROM SINGLE-ION TRACKS IN INTEGRATED CIRCUITS Patent Application

JOHN A. ZOUTENDYK, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 23 Jul. 1990 17 p (Contract NAS7-918)

(NASA-CASE-NPO-18075-1-CU; NAS 1.71:NPO-18075-1-CU;

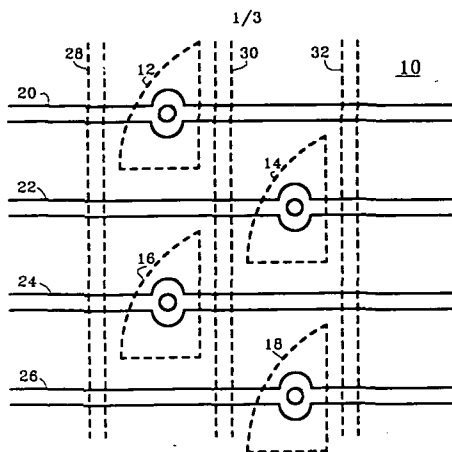
US-PATENT-APPL-SN-555865) Avail: NTIS HC/MF A03 CSCL 09C

A error detector and imaging system for multiple-bit errors from

33 ELECTRONICS AND ELECTRICAL ENGINEERING

single-ion tracks in integrated circuits distinguishes between multiple bit errors caused by ion tracks which do not strike charge collection junctions having substantial capacitance and those that do on the basis of the sensitivity of the errors to changes in VDD. Data which do not occur during the time interval between successive read cycles, which do not occur at integral multiples of the read clock, whose recorded time tags are not greater than those of previous data or whose recorded address tags are not greater than those of previous data are discarded as bad data before further processing and display.

NASA



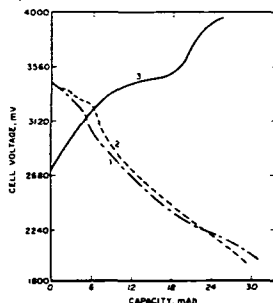
N91-14536* National Aeronautics and Space Administration. Pasadena Office, CA.

ORGANIC CATHODE FOR A SECONDARY BATTERY Patent

RATNAKUMAR V. BUGGA, inventor (to NASA), SALVADOR DISTEFANO, inventor (to NASA), ROGER M. WILLIAMS, inventor (to NASA), and CLYDE P. BANKSTON, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 7 Sep. 1989 9 p Filed 7 Sep. 1989 Prepared in cooperation with Jet Propulsion Lab., California Inst. of Tech., Pasadena (NASA-CASE-NPO-17604-1-CU; US-PATENT-4,966,823; US-PATENT-APPL-SN-404288; US-PATENT-CLASS-429-104; US-PATENT-CLASS-429-213; US-PATENT-CLASS-252-62.2; INT-PATENT-CLASS-H07M-10/39; INT-PATENT-CLASS-H07M-4/60) Avail: US Patent and Trademark Office CSCL 09A

A liquid catholyte for a battery based on liquid metal such as sodium anode and a solid, ceramic separator such as beta alumina (BASE) comprises a mixture of a Group I-III metal salt such as sodium tetrachloroaluminate and a minor amount of an organic carbonitrile depolarizer having at least one adjacent ethylenic band such as 1 to 40 percent by weight of tetracyanoethylene. The tetracyanoethylene forms an adduct with the molten metal salt.

Official Gazette of the U.S. Patent and Trademark Office



N91-14537* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

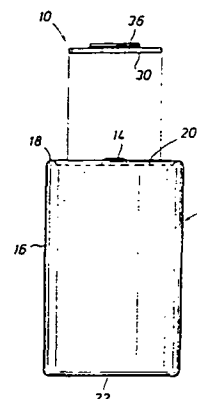
THERMAL SWITCH DISC FOR SHORT CIRCUIT PROTECTION OF BATTERIES Patent

ERIC C. DIMPAULT-DARCY, inventor (to NASA) and BOBBY J. BRAGG, inventor (to NASA) 27 Nov. 1990 5 p Filed 27 Apr. 1989

(NASA-CASE-MSC-21428-1; US-PATENT-APPL-SN-343652; US-PATENT-CLASS-338-32; US-PATENT-CLASS-320-51; US-PATENT-CLASS-338-221; INT-PATENT-CLASS-H01L-43/00; US-PATENT-4,973,936) Avail: US Patent and Trademark Office CSCL 09A

A protective device for one battery or serially arranged battery cells is disclosed and is adapted to fit between one battery and its terminal connector or between adjacent battery cells. The device incorporates a disk of positive temperature coefficient material having a pair of circular end faces for contact. The disk is supported by a ring adhesively joined thereto, the ring having a central axial opening to enable the button terminal of a battery cell to contact against the disk as the disk and battery cell are arranged in a single battery application or in serial contact with similar battery cells.

Official Gazette of the U.S. Patent and Trademark Office



N91-14538* National Aeronautics and Space Administration. Pasadena Office, CA.

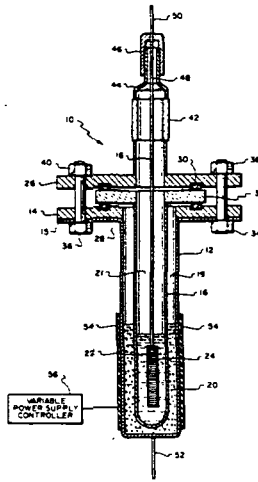
COPPER CHLORIDE CATHODE FOR A SECONDARY BATTERY Patent

RATNAKUMAR V. BUGGA, inventor (to NASA), SALVADOR DISTEFANO, inventor (to NASA), GANESAN NAGASUBRAMANIAN, inventor (to NASA), and CLYDE P. BANKSTON, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 31 Jul. 1990 6 p Filed 11 Sep. 1989

(NASA-CASE-NPO-17640-1-CU; US-PATENT-4,945,012; US-PATENT-APPL-SN-405169; US-PATENT-CLASS-429-103; US-PATENT-CLASS-429-120; INT-PATENT-CLASS-H01M-6/20) Avail: US Patent and Trademark Office CSCL 09A

Higher energy and power densities are achieved in a secondary battery based on molten sodium and a solid, ceramic separator such as a beta alumina and a molten catholyte such as sodium tetrachloroaluminate and a copper chloride cathode. The higher cell voltage of copper chloride provides higher energy densities

and the higher power density results from increased conductivity resulting from formation of copper as discharge proceeds.
Official Gazette of the U.S. Patent and Trademark Office



N91-14539* National Aeronautics and Space Administration, Pasadena Office, CA.

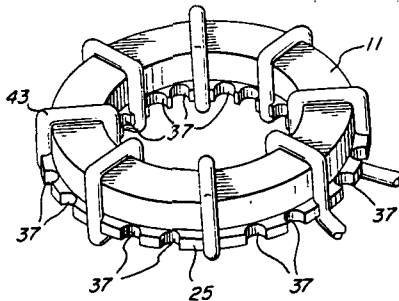
IMPROVED HIGH POWER/HIGH FREQUENCY INDUCTOR Patent

W. T. MCLYMAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 4 Dec. 1990 5 p Filed 30 Nov. 1989

(NASA-CASE-NPO-17830-1-CU; US-PATENT-4,975,672; US-PATENT-APPL-SN-443297; US-PATENT-CLASS-336-198; US-PATENT-CLASS-336-205; US-PATENT-CLASS-336-229; INT-PATENT-CLASS-H01F-27/30) Avail: US Patent and Trademark Office CSCL 09A

A toroidal core is mounted on an alignment disc having uniformly distributed circumferential notches or holes therein. Wire is then wound about the toroidal core in a uniform pattern defined by the notches or holes. Prior to winding, the wire may be placed within shrink tubing. The shrink tubing is then wound about the alignment disc and core and then heat-shrunk to positively retain the wire in the uniform position on the toroidal core.

Official Gazette of the U.S. Patent and Trademark Office



N91-14550* National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, MD.

DIGITIZED SYNCHRONOUS DEMODULATOR Patent

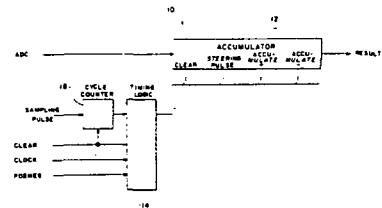
CHRISTOPHER E. WOODHOUSE, inventor (to NASA) 27 Nov.

1990 6 p Filed 10 Oct. 1989

(NASA-CASE-GSC-13237-1; US-PATENT-4,973,914; US-PATENT-APPL-SN-418612; US-PATENT-CLASS-329-363; US-PATENT-CLASS-328-151; INT-PATENT-CLASS-H03D-1/00) Avail: US Patent and Trademark Office CSCL 09A

A digitized synchronous demodulator is constructed entirely of digital components including timing logic, an accumulator, and means to digitally filter the digital output signal. Indirectly, it accepts, at its input, periodic analog signals which are converted to digital signals by traditional analog-to-digital conversion techniques. Broadly, the input digital signals are summed to one of two registers within an accumulator, based on the phase of the input signal and mediated by timing logic. At the end of a predetermined number of cycles of the inputted periodic signals, the contents of the register that accumulated samples from the negative half cycle is subtracted from the accumulated samples from the positive half cycle. The resulting difference is an accurate measurement of the narrow band amplitude of the periodic input signal during the measurement period. This measurement will not include error sources encountered in prior art synchronous demodulators using analog techniques such as offsets, charge injection errors, temperature drift, switching transients, settling time, analog to digital converter missing code, and linearity errors.

Official Gazette of the U.S. Patent and Trademark Office



N91-14551* National Aeronautics and Space Administration, Pasadena Office, CA.

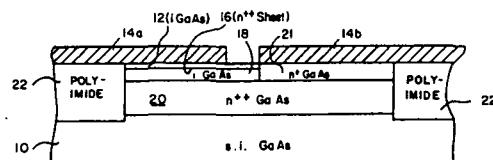
MILLIMETER-WAVE MONOLITHIC DIODE-GRID FREQUENCY MULTIPLIER Patent

JOSEPH MASERJIAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 4 Sep. 1990 7 p Filed 13 Dec. 1988

(NASA-CASE-NPO-17258-1-CU; US-PATENT-4,954,864; US-PATENT-APPL-SN-283673; US-PATENT-CLASS-357-30; US-PATENT-CLASS-357-15; US-PATENT-CLASS-357-29; US-PATENT-CLASS-357-32; US-PATENT-CLASS-357-58; INT-PATENT-CLASS-H01L-27/14) Avail: US Patent and Trademark Office CSCL 09A

A semiconductor diode structure useful for harmonic generation of millimeter or submillimeter wave radiation from a fundamental input wave is fabricated on a GaAs substrate. A heavily doped layer of n^{++} GaAs is produced on the substrate and then a layer of intrinsic GaAs on said heavily doped layer on top of which a sheet of heavy doping ($++$) is produced. A thin layer of intrinsic GaAs grown over the sheet is capped with two metal contacts separated by a gap to produce two diodes connected back to back through the n^{++} layer for multiplication of frequency by an odd multiple. If only one metal contact caps the thin layer of intrinsic GaAs, the second diode contact is produced to connect to the n^{++} layer for multiplication of frequency by an even number. The odd or even frequency multiple is selected by a filter. A phased array of diodes in a grid will increase the power of the higher frequency generated.

Official Gazette of the U.S. Patent and Trademark Office



N91-14552* National Aeronautics and Space Administration.
Lewis Research Center, Cleveland, OH.

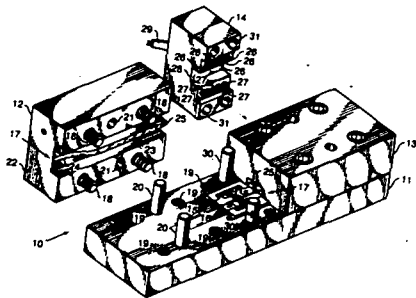
**UNIVERSAL NONDESTRUCTIVE MM-WAVE INTEGRATED
CIRCUIT TEST FIXTURE Patent**

ROBERT R. ROMANOVSKY, inventor (to NASA) and KURT A. SHALKHAUSER, inventor (to NASA) 25 Dec. 1990 9 p Filed 10 Aug. 1989

(NASA-CASE-LEW-14746-1; US-PATENT-4,980,636;
US-PATENT-APPL-SN-392239; US-PATENT-CLASS-324-158F;
US-PATENT-CLASS-324-158P; US-PATENT-CLASS-324-601;
US-PATENT-CLASS-333-247; INT-PATENT-CLASS-G01R-1/04)
Avail: US Patent and Trademark Office CSCL 09C

Monolithic microwave integrated circuit (MMIC) test includes a bias module having spring-loaded contacts which electrically engage pads on a chip carrier disposed in a recess of a base member. RF energy is applied to and passed from the chip carrier by chamfered edges of ridges in the waveguide passages of housings which are removably attached to the base member. Thru, Delay, and Short calibration standards having dimensions identical to those of the chip carrier assure accuracy and reliability of the test. The MMIC chip fits in an opening in the chip carrier with the boundaries of the MMIC lying on movable reference planes thereby establishing accuracy and flexibility.

Official Gazette of the U.S. Patent and Trademark Office



N91-15489*# National Aeronautics and Space Administration.
Pasadena Office, CA.

**HIGH Q QUASI-OPTICAL TUNABLE RESONATOR Patent
Application**

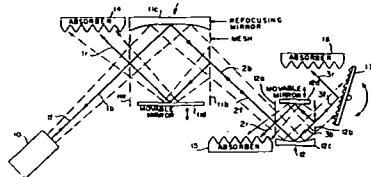
MARGARET A. FRERKING, inventor (to NASA) and KAREN A. LEE, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 13 Dec. 1989 23 p

(Contract NAS7-918)

(NASA-CASE-NPO-17919-1-CU; NAS 1.71:NPO-17919-1-CU;
US-PATENT-APPL-SN-450188) Avail: NTIS HC/MF A03 CSCL 09C

A reflection cavity which could serve as the resonator for a submillimeter wavelength oscillator employing a resonant tunneling device is comprised of three elements in cascade: a high Q, high finesse folded Fabry-Perot resonator, a lower Q low finesse Fabry-Perot resonator and a Littrow mounted diffraction grating for reflecting radiation back upon itself and performing the final filtering after the first high Q Fabry-Perot resonator has provided sharp peaks in the signal spectrum and the second low Q Fabry-Perot resonator has filtered half the longitudinal modes passed by the first high Q Fabry-Perot resonator, i.e., has filtered alternate peaks in the signal spectrum. Tuning the quasi-optical reflection cavity is accomplished by adjusting the angle of incidence of the diffraction grating and adjusting the space between planar mirrors and elliptical refocusing mirrors of the high and low Q Fabry-Perot resonators.

NASA



FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

N91-13657*# National Aeronautics and Space Administration.
Lyndon B. Johnson Space Center, Houston, TX.

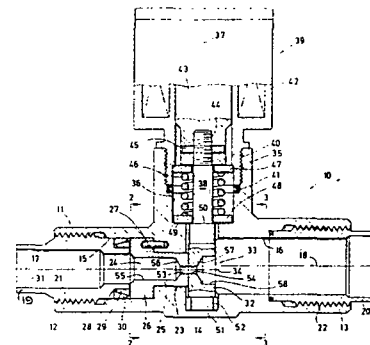
VARIABLE ORIFICE FLOW REGULATOR Patent Application

ROLLIN CHRISTIANSON, inventor (to NASA) 11 Apr. 1990 18 p

(NASA-CASE-MSC-21549-1; NAS 1.71:MSC-21549-1;
US-PATENT-APPL-SN-507553) Avail: NTIS HC/MF A03 CSCL 20D

A flow regulator for high-pressure fluids at elevated temperatures includes a body having a flow passage extending between inlet and outlet openings. First and second orifice members are arranged in the flow passage so at least one of the orifice members can be moved transversely in relation to the flow passage between one operating position where the two orifice openings are aligned for establishing a maximum flow rate of fluids flowing through the flow passage and at least one other operating position in which the two openings are moderately misaligned with one another for establishing a predetermined reduced flow rate of fluids flowing through the flow passage.

NASA



N91-13658*# National Aeronautics and Space Administration.
Pasadena Office, CA.

**MEASUREMENT OF WAVES IN FLOWS ACROSS A SURFACE
Patent Application**

JAMES M. KENDALL, JR., inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 16 Aug. 1990 16 p (Contract NAS7-918)

(NASA-CASE-NPO-17479-1-CU; NAS 1.71:NPO-17479-1-CU;
US-PATENT-APPL-SN-568127) Avail: NTIS HC/MF A03 CSCL 20D

A method and apparatus is disclosed for sensing wave flow across a surface wherein at least two pressure levels are sensed and combined to provide a representation of waves within the flow. In the preferred embodiment holes bored through the aircraft surface at an interval of one-half the wavelength of the flow being measured introduce pressure perturbations into a cavity so they may acoustically interfere. The interfering waveform is sensed by at least one microphone disposed in the cavity.

NASA

N91-13668* National Aeronautics and Space Administration.
Lewis Research Center, Cleveland, OH.

HEAT TRANSFER DEVICE AND METHOD OF MAKING THE SAME Patent Application

BRUCE A. BANKS, inventor (to NASA) and JAMES R. GAIER, inventor (to NASA) 30 Mar. 1990 11 p
(NASA-CASE-LEW-14162-1; NAS 1.71:LEW-14162-1;
US-PATENT-APPL-SN-501893) Avail: NTIS HC/MF A03 CSCL 20D

Gas derived graphite fibers are generated by the decomposition of an organic gas. These fibers when joined with a suitable binder are used to make a high thermal conductivity composite material. The fibers may be intercalated. The intercalate can be halogen or halide salt, alkaline metal, or any other species which contributes to the electrical conductivity improvement of the graphite fiber. The heat transfer device may also be made of intercalated highly oriented pyrolytic graphite and machined, rather than made of fibers.

NASA

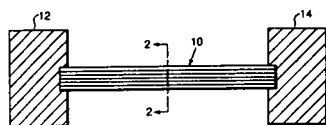


FIG. 1

N91-14562* National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.

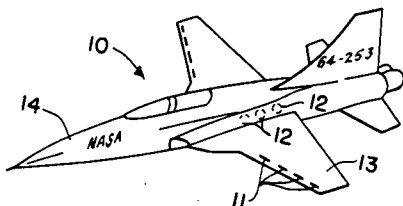
ACTIVE CONTROL OF BOUNDARY LAYER TRANSITION AND TURBULENCE Patent

LUCIO MAESTRELLO, inventor (to NASA) 12 Jun. 1990 7 p
Filed 11 Mar. 1986

(NASA-CASE-LAR-13532-1; US-PATENT-4,932,610;
US-PATENT-APPL-SN-838649; US-PATENT-CLASS-244-203;
US-PATENT-CLASS-244-204; US-PATENT-CLASS-244-130;
US-PATENT-CLASS-114-67A; INT-PATENT-CLASS-B64B-21/00)
Avail: US Patent and Trademark Office CSCL 20D

The invention is a system and method for controlling boundary layer flow such that flow separation can be delayed and skin friction drag can be reduced. The invention consists of heater elements used to trigger turbulent flow and audio speakers used to suppress turbulent oscillations. By inducing turbulent oscillations into the flow in a region of positive pressure gradient, pressure patterns became more regular. The suppression of these patterns can be accomplished by imposing an out-of-phase suppressing wave. This wave is the audio output generated by a feedback amplifier using inputs from a hot-wire anemometer reading downstream turbulence. The novel features of the present invention are the tripping of boundary layer flow in a region of positive pressure gradient and the cooperative use of the feedback means to control turbulence. The result is a significant reduction in drag and separation problems.

Official Gazette of the U.S. Patent and Trademark Office



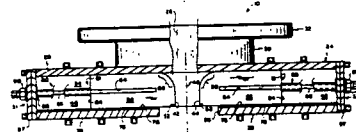
N91-14563* National Aeronautics and Space Administration.
Marshall Space Flight Center, Huntsville, AL.

LOW-NOISE NOZZLE VALVE Patent

HAL S. GWIN, inventor (to NASA) and JAMES AARON, inventor (to NASA) 18 Sep. 1990 8 p Filed 7 Sep. 1989
(NASA-CASE-MFS-28383-1; US-PATENT-4,957,139;
US-PATENT-APPL-SN-404290; US-PATENT-CLASS-137-556;
US-PATENT-CLASS-251-212; INT-PATENT-CLASS-F16K-3/32;
INT-PATENT-CLASS-F16K-37/00;
INT-PATENT-CLASS-F16K-3/316) Avail: US Patent and Trademark Office CSCL 20D

A low noise, variable discharge area, valve is constructed having opposed recesses within which a pair of gates are slidably disposed. Each of the gates is provided with upstream edges having a radius thereon, the radius enabling smooth, accelerated, low noise flow therebetween. The gates are further provided with tracks along each side, which in turn slide along splines set in the side walls of the valve. A threaded rod which rotates in a threaded insert in a rear wall of each of the gates, serves to move the gates within their respective recesses.

Official Gazette of the U.S. Patent and Trademark Office



N91-17340* National Aeronautics and Space Administration.
Lyndon B. Johnson Space Center, Houston, TX.

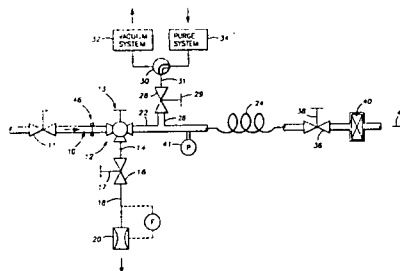
HIGH VELOCITY GAS PARTICULATE SAMPLING SYSTEM Patent Application

WALLACE C. TUTHILL, inventor (to NASA) 11 Dec. 1990 12 p

(NASA-CASE-MS-C-21729-1; NAS 1.71:MSC-21729-1;
US-PATENT-APPL-SN-625344) Avail: NTIS HC/MF A03 CSCL 20D

A gas sampling system is disclosed for determining particulate matter contamination in a high velocity gas flow where the sampling chamber is first cleaned, then evacuated and is coupled by a closed three way valve in a straight line relationship to the gas supply line. A predetermined gas flow rate is established through the three way valve which is quickly opened to couple the dynamically flow gas to the evacuated sample chamber in a straight line relationship to trap a gas sample under dynamic conditions. When the sampling chamber has a gas sample the three way valve is again closed so that particulate matter in the sample chamber can be flushed from the sample chamber with a compatible liquid to a filter for collection and analysis.

NASA



INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

N91-13683* National Aeronautics and Space Administration.
Lyndon B. Johnson Space Center, Houston, TX.

VOLUMETRIC MEASUREMENT OF TANK VOLUME Patent

Application

RICHARD T. WALTER, inventor (to NASA), PAUL VANBUSKIRK, inventor (to NASA) (Lockheed Engineering and Sciences Co., Houston, TX.), WILLIAM WEBER, inventor (to NASA), and RICHARD FROEBEL, inventor (to NASA) 28 Dec. 1989 18 p (NASA-CASE-MSC-21500-1; NAS 1.71:MSC-21500-1; US-PATENT-APPL-SN-458258) Avail: NTIS HC/MF A03 CSCL 14B

A method is disclosed for determining the volume of compressible gas in a system including incompressible substances in a zero-gravity environment consisting of measuring the change in pressure (ΔP) for a known volume change rate ($\Delta V/\Delta t$) in the polytropic region between isothermal and adiabatic conditions. The measurements are utilized in an idealized formula for determining the change in isothermal pressure (ΔP_{iso}) for the gas. From the isothermal pressure change (ΔP_{iso}) the gas volume is obtained. The method is also applicable to determination of gas volume by utilizing work (W) in the compression process. In a passive system, the relationship of specific densities can be obtained.

NASA

N91-13684*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

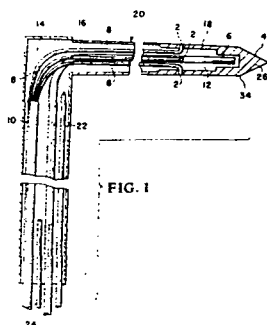
WATER COOLED STATIC PRESSURE PROBE Patent

Application

NICHOLAS T. LAGEN, inventor (to NASA) (George Washington Univ., Washington, DC.), JOHN W. EVES, inventor (to NASA), GARLAND D. REECE, inventor (to NASA), and STEVE K. GEISSINGER, inventor (to NASA) 31 Aug. 1990 18 p (NASA-CASE-LAR-14340-1-CU; NAS 1.71:LAR-14340-1-CU; US-PATENT-APPL-SN-575695) Avail: NTIS HC/MF A03 CSCL 14B

An improved static pressure probe containing a water cooling mechanism is disclosed. This probe has a hollow interior containing a central coolant tube and multiple individual pressure measurement tubes connected to holes placed on the exterior. Coolant from the central tube symmetrically immerses the interior of the probe, allowing it to sustain high temperature, in the region of 2500 F, supersonic jet flow indefinitely, while still recording accurate pressure data. The coolant exits the probe body by way of a reservoir attached to the aft of the probe. The pressure measurement tubes are joined to a single, larger manifold in the reservoir. This manifold is attached to a pressure transducer that records the average static pressure.

NASA



N91-13685*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

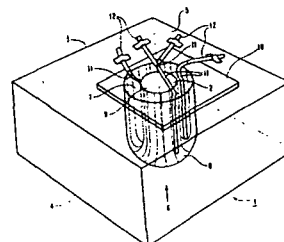
PLUG-TYPE HEAT FLUX GAUGE AND METHOD OF PRODUCING SAME Patent Application

CURT H. LIEBERT, inventor (to NASA) and JOHN KOCH, JR.,

inventor (to NASA) 31 May 1990 17 p (NASA-CASE-LEW-14967-1; NAS 1.71:LEW-14967-1; US-PATENT-APPL-SN-531433) Avail: NTIS HC/MF A03 CSCL 14B

A plug-type heat flux gauge formed in a material specimen and having a thermoplug integrally formed in the material specimen, and a method for making the same are disclosed. The thermoplug is surrounded by a concentric annulus, through which thermocouple wires are routed. The end of each thermocouple wire is welded to the thermoplug, with each thermocouple wire welded at a different location along the length of the thermoplug. The thermoplug and concentric annulus may be formed in the material specimen by electrical discharge machining and trepanning procedures.

NASA



N91-13686*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

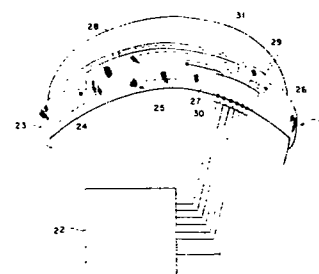
PASSIVE FETAL MONITORING SENSOR Patent Application

16 Jul. 1990 14 p

(NASA-CASE-LAR-14088-1; NAS 1.71:LAR-14088-1; US-PATENT-APPL-SN-552670) Avail: NTIS HC/MF A03 CSCL 14B

The invention is an ambulatory, passive sensor for use in a fetal monitoring system. The invention incorporates piezoelectric polymer film combined with a metallic mounting plate fastened to a belt and electrically connected to a signal processing unit by means of a shielded cable. The purpose of the sensor is to receive pressure pulses emitted from a fetus inside an expectant mother and to provide means for filtering out pressure pulses arising from other sources, such as the maternal heart.

NASA



N91-13687*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

DUAL STRAIN GAGE BALANCE SYSTEM FOR MEASURING LIGHT LOADS Patent Application

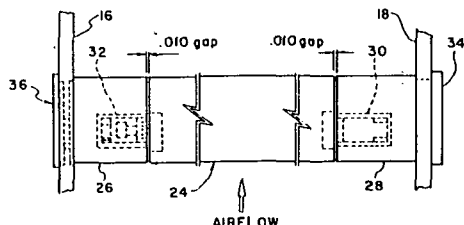
PAUL W. ROBERTS, inventor (to NASA) 18 Sep. 1990 20 p

(NASA-CASE-LAR-14419-1; NAS 1.71:LAR-14419-1; US-PATENT-APPL-SN-584018) Avail: NTIS HC/MF A03 CSCL 14B

A dual strain gage balance system for measuring normal and axial forces and pitching moment of a metric airfoil model imparted by aerodynamic loads applied to the airfoil model during wind tunnel testing includes a pair of non-metric panels being rigidly

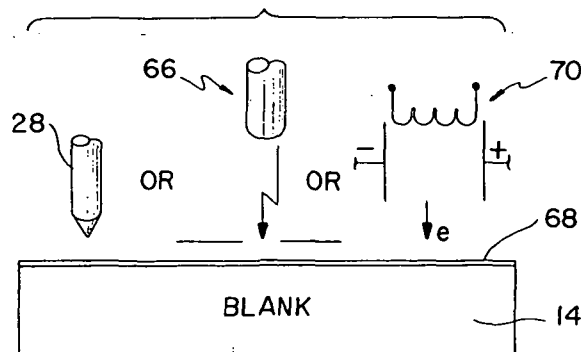
connected to and extending towards each other from opposite sides of the wind tunnel, and a pair of strain gage balances, each connected to one of the non-metric panels and to one of the opposite ends of the metric airfoil model for mounting the metric airfoil model between the pair of non-metric panels. Each strain gage balance has a first measuring section for mounting a first strain gage bridge for measuring normal force and pitching moment and a second measuring section for mounting a second strain gage bridge for measuring axial force.

NASA



holographic model on a ruled grating blank. A ruling engine causes the sensing head not only to scan the surface of the holographic grating model but also drive a blazing type ruling stylus or an equivalent type device in accordance with an error signal resulting from a departure of a sensing tip from the top of the holographic model groove as a function of tunneling current.

NASA



N91-13691*# National Aeronautics and Space Administration. John C. Stennis Space Center, Bay Saint Louis, MS.

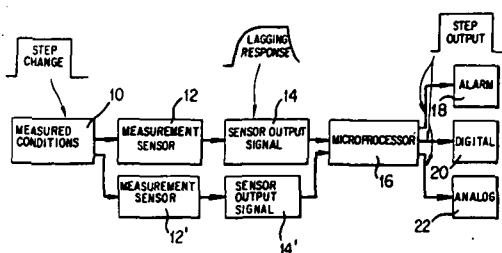
PREDICTIVE SENSOR METHOD AND APPARATUS Patent Application

WILLIAM L. NAIL, inventor (to NASA), THOMAS L. KOGER, inventor (to NASA), and VIVIEN CAMBRIDGE, inventor (to NASA) (Sverdrup Technology, Inc., Bay Saint Louis, MS.) 7 Mar. 1990 14 p

(NASA-CASE-SSC-00006-1; NAS 1.71:SSC-00006-1; US-PATENT-APPL-SN-489997) Avail: NTIS HC/MF A03 CSCL 14B

A predictive algorithm is used to determine, in near real time, the steady state response of a slow responding sensor such as hydrogen gas sensor of the type which produces an output current proportional to the partial pressure of the hydrogen present. A microprocessor connected to the sensor samples the sensor output at small regular time intervals and predicts the steady state response of the sensor in response to a perturbation in the parameter being sensed, based on the beginning and end samples of the sensor output for the current sample time interval.

NASA



N91-13693*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

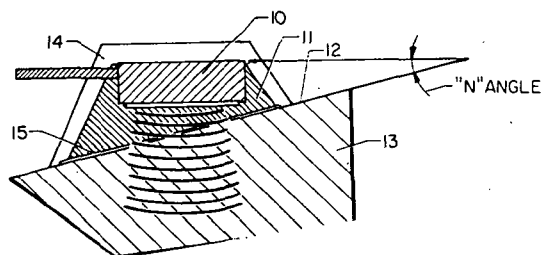
TRANSDUCER HOLDER AND METHOD OF MAKING Patent Application

JOHN A. COMPANION, inventor (to NASA) (PRC Kentron, Inc., Hampton, VA.) 25 Sep. 1990 17 p

(NASA-CASE-LAR-14027-1; NAS 1.71:LAR-14027-1; US-PATENT-APPL-SN-587880) Avail: NTIS HC/MF A03 CSCL 14B

The invention is a holder for supporting and acoustically coupling a transducer to a surface of a test object. The holder is formed in one piece in a suitable mold of a castable gel-like material having a determined acoustical impedance loss characteristic, the transducer being embedded in the holder as it is formed. The transducer is prepositioned within the mold at a determined angle N relative to the surface of the test object. The gel-like material may be composed of a solution of water and ethylene glycol in a collagen matrix.

NASA



N91-13692*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

CONTROL SYSTEM FOR RULING BLAZED, ABERRATION CORRECTED DIFFRACTION GRATINGS Patent Application

DOUGLAS B. LEVITON, inventor (to NASA) 23 Aug. 1990 14 p

(NASA-CASE-GSC-13240-1; NAS 1.71:GSC-13240-1; US-PATENT-APPL-SN-571344) Avail: NTIS HC/MF A03 CSCL 14E

The grooved surface of an aberration-corrected holographic model grating is sensed by utilizing the sensing head of a scanning tunneling microscope. The sensing head is mechanically connected to a blazing type stylus for replicating the groove pattern of the

N91-13694*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

REAL-TIME DYNAMIC HOLOGRAPHIC IMAGE STORAGE DEVICE Patent

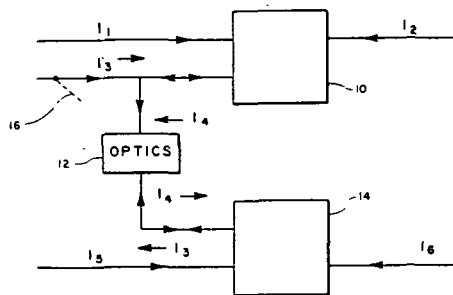
SHARON S. LAFLEUR, inventor (to NASA) and RAYMOND C. MONTGOMERY, inventor (to NASA) 3 Apr. 1990 8 p Filed 2 Mar. 1989

(NASA-CASE-LAR-13989-1; US-PATENT-4,913,534; US-PATENT-APPL-SN-318217; US-PATENT-CLASS-350-3.64; US-PATENT-CLASS-350-320; US-PATENT-CLASS-350-354; INT-PATENT-CLASS-G03H-1/02) Avail: US Patent and Trademark Office CSCL 14B

35 INSTRUMENTATION AND PHOTOGRAPHY

A real-time dynamic holographic image storage device uses four-wave mixing in a pair of photorefractive crystals. An oscillation is produced between the crystals which can be maintained indefinitely after the initial object beam is discontinued. The object beam produces an interference pattern in a first crystal to produce phase-conjugated object beam which is directed towards the second crystal. In the second crystal another interference pattern is created which produces a reconstructed object beam. The reconstructed object beam is directed back towards the first crystal. The interference patterns are produced by interaction of the object and phase-conjugated object beam with a read and write beam in each of the crystals. By manipulation of the ratio of the read and write beam intensities in at least one of the crystals, the phase-conjugate or reconstructed object beam output therefrom can be amplified to maintain stable oscillation between the two crystals.

Official Gazette of the U.S. Patent and Trademark Office



N91-14587* National Aeronautics and Space Administration.
Pasadena Office, CA.

APPARATUS AND METHOD FOR CHARACTERIZING THE TRANSMISSION EFFICIENCY OF A MASS SPECTROMETER

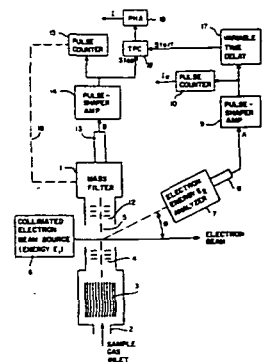
SANTASH SRIVASYTAVA, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 27 Nov. 1990 9 p Filed 26 May 1989

(NASA-CASE-NPO-16989-1-CU; US-PATENT-4,973,840;
US-PATENT-APPL-SN-358027; US-PATENT-CLASS-250-281;
US-PATENT-CLASS-250-282; US-PATENT-CLASS-250-286;
US-PATENT-CLASS-250-287; US-PATENT-CLASS-250-288;
US-PATENT-CLASS-250-305; US-PATENT-CLASS-250-423)

Avail: US Patent and Trademark Office CSDL 14B

An electron/ion coincidence technique is employed to characterize the absolute mass dependent transmission efficiency of mass spectrometers. The technique is not dependent upon the partial pressure of the sample beam or the ionization cross sections of calibrant gases.

Official Gazette of the U.S. Patent and Trademark Office



N91-14588* National Aeronautics and Space Administration.
Pasadena Office, CA.

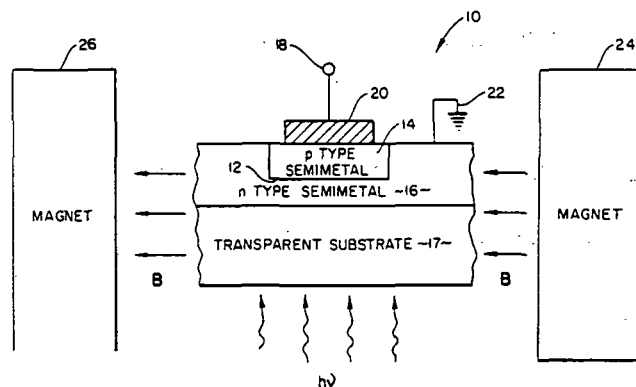
FIELD INDUCED GAP INFRARED DETECTOR Patent

C. THOMAS ELLIOTT, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 28 Aug. 1990 14 p Filed 21 Jun. 1989

(NASA-CASE-NPO-17526-1-CU; US-PATENT-4,952,811;
US-PATENT-APPL-SN-369403; US-PATENT-CLASS-250-370.13;
US-PATENT-CLASS-250-338.1; US-PATENT-CLASS-250-338.2;
US-PATENT-CLASS-250-493.1; US-PATENT-CLASS-250-370.12;
US-PATENT-CLASS-357-30; US-PATENT-CLASS-357-27) Avail:
US Patent and Trademark Office CSCL 14B

A tunable infrared detector which employs a vanishing band gap semimetal material provided with an induced band gap by a magnetic field to allow intrinsic semiconductor type infrared detection capabilities is disclosed. The semimetal material may thus operate as a semiconductor type detector with a wavelength sensitivity corresponding to the induced band gap in a preferred embodiment of a diode structure. Preferred semimetal materials include $\text{Hg}(1-x)\text{Cd}(x)\text{Te}$, x is less than 0.15, HgCdSe , BiSb , $\alpha\text{-Sn}$, HgMgTe , HgMnTe , HgZnTe , HgMnSe , HgMgSe , and HgZnSe . The magnetic field induces a band gap in the semimetal material proportional to the strength of the magnetic field allowing tunable detection cutoff wavelengths. For an applied magnetic field from 5 to 10 tesla, the wavelength detection cutoff will be in the range of 20 to 50 micrometers for $\text{Hg}(1-x)\text{Cd}(x)\text{Te}$ alloys with x about 0.15. A similar approach may also be employed to generate infrared energy in a desired band gap and then operating the structure in a light emitting diode or semiconductor laser type of configuration.

Official Gazette of the U.S. Patent and Trademark Office



N91-14590* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

THERMAL COMPENSATING MOUNT Patent

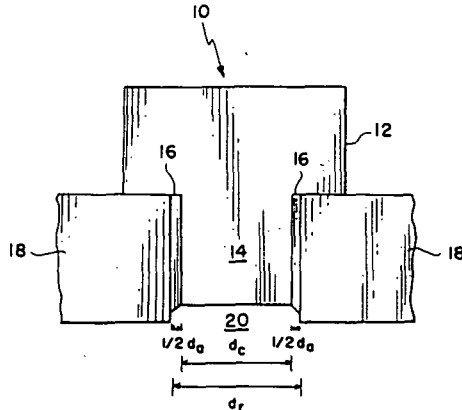
ANTONY JALINK, JR., inventor (to NASA) and SCOTT R. CAMPBELL, inventor (to NASA) 23 Jan. 1990 4 p Filed 12 Jun. 1989 Continuation of abandoned US-Patent-Appl-SN-168065, filed 14 Mar. 1988

(NASA-CASE-LAR-14207-1; US-PATENT-4,895,430;
US-PATENT-APPL-SN-366205; US-PATENT-APPL-SN-168065;
US-PATENT-CLASS-350-287; US-PATENT-CLASS-350-500;
INT-PATENT-CLASS-G02B-7/18;
INT-PATENT-CLASS-G02B-27/64) Avail: US Patent and
Trademark Office CSDL 14B

The main objective is to provide a device for maintaining the alignment integrity of an alignment sensitive component over a wide range of temperatures. A thermal compensating mount is presented. A cylindrical extension is integrally formed to the alignment sensitive component. Both the extension and component share the same coefficient of thermal expansion. The cylindrical extension is placed into a mounting structure which has a diameter greater than that of the extension. An adhesive secures the

cylindrical extension to the mount. The difference between the diameters of the cylindrical extension and the cylindrical receptacle is such that the differential thermal expansion across the extension and the receptacle edges is exactly compensated for by the thermal compensation of the adhesive between them. Accordingly, the alignment sensitive component does not change position when subjected to temperature variations. One application of this invention is laser optical-path folding prisms, which are fixed to the mounting surface by a small amount of epoxy adhesive.

Official Gazette of the U.S. Patent and Trademark Office



N91-14591* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

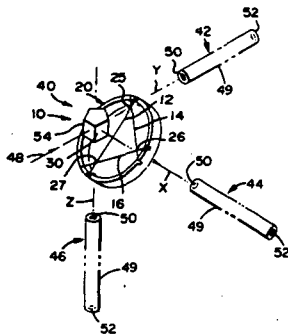
MULTIPLE AXIS RETICLE Patent

CHRIS E. BARNES, inventor (to NASA) and WILLIAM D. GUNTER, inventor (to NASA) (Photon Applications, San Jose, CA.) 18 Sep. 1990 9 p Filed 6 Oct. 1989

(NASA-CASE-ARC-11886-1-SB; US-PATENT-4,957,357; US-PATENT-APPL-SN-418374; US-PATENT-CLASS-350-576; US-PATENT-CLASS-33-261; INT-PATENT-CLASS-G02B-23/00; INT-PATENT-CLASS-F41G-11/00) Avail: US Patent and Trademark Office CSCL 14B

A reticle permits the alignment of three orthogonal axes (X, Y and Z) that intersect at a common target point. Thin, straight filaments are supported on a frame. The filaments are each contained in a different orthogonal plane (S sub xy, S sub xz, and S sub yz) and each filament intersects two of the three orthogonal axes. The filaments, as viewed along the frame axis, give the appearance of a triangle with a V extending from each triangle vertex. When axial alignment is achieved, the filament portions adjacent to a triangle vertex are seen (along the axis of interest) as a right-angle cross, whereas these filament portions are seen to intersect at an oblique angle when axial misalignment occurs. The reticle is open in the region near the target point leaving ample space for alignment aids such as a pentaprism or a cube mirror.

Official Gazette of the U.S. Patent and Trademark Office



N91-15511* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

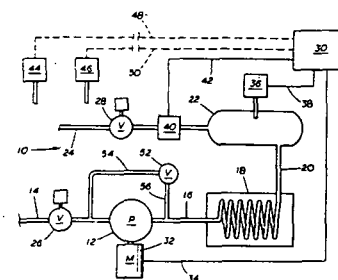
TANK GAUGING APPARATUS AND METHOD Patent

BRIAN G. MORRIS, inventor (to NASA) 18 Sep. 1990 8 p Filed 18 Aug. 1989 Continuation of US-Patent-Appl-SN-217725, filed 11 Jul. 1988

(NASA-CASE-MSC-21059-2; US-PATENT-4,956,996; US-PATENT-APPL-SN-396726; US-PATENT-APPL-SN-217725; US-PATENT-CLASS-73-149; INT-PATENT-CLASS-G01F-17/00) Avail: US Patent and Trademark Office CSCL 14B

An apparatus for gauging the amount of liquid in a container of liquid and gas under low or zero gravity net conditions includes an accumulator and appropriate connector apparatus for communicating gas between the accumulator and the container. In one form of the invention, gas is removed from the container and compressed into the accumulator. The pressure and temperature of the fluid in the container is measured before and after removal of the gas; the pressure and temperature of the gas in the accumulator is measured before and after compression of the gas into the accumulator from the container. These pressure and temperature measurements are used to determine the volume of gas in the container, whereby the volume of the liquid in the container can be determined from the difference between the known volume of the container and the volume of gas in the container. Gas from the accumulator may be communicated into the container in a similar process as a verification of the gauging of the liquid volume, or as an independent process for determining the volume of liquid in the container.

Official Gazette of the U.S. Patent and Trademark Office



N91-15512* National Aeronautics and Space Administration. Pasadena Office, CA.

REMOTE OBJECT CONFIGURATION/ORIENTATION DETERMINATION Patent

LARRY L. SCHUMACHER, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 23 Oct. 1990 7 p Filed 29 Aug. 1988

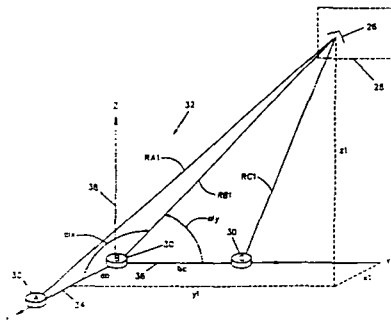
(NASA-CASE-NPO-17436-1-CU; US-PATENT-4,964,722; US-PATENT-APPL-SN-237035; US-PATENT-CLASS-356-152; US-PATENT-CLASS-356-5; US-PATENT-CLASS-356-141; INT-PATENT-CLASS-G01B-11/26; INT-PATENT-CLASS-G01C-1/00; INT-PATENT-CLASS-G01C-3/08) Avail: US Patent and Trademark Office CSCL 14B

This invention relates to object detection and location systems and, more particularly, to a method for determining the configuration and location of an object with respect to an X, Y, X coordinate frame. In space applications in particular, there is a need to be able to passively determine the orientation of an object at a distance, for example, in the control of large, flexible space structures. At present, there is no available method or apparatus which will allow the operator to make such a determination. A similar problem and need exists in robotic application. It is the

35 INSTRUMENTATION AND PHOTOGRAPHY

primary object of this invention to provide a system for remotely defining an object's configuration in a manner compatible with a computer's analytical capability.

Official Gazette of the U.S. Patent and Trademark Office



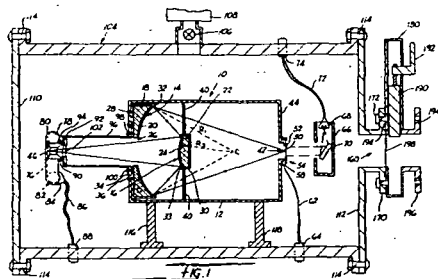
N91-15519*# National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, AL.

WATER WINDOW IMAGING X RAY MICROSCOPE Patent Application

RICHARD B. HOOVER, inventor (to NASA) 31 Oct. 1990 23 p (NASA-CASE-MFS-28485-1; NAS 1.71:MFS-28485-1; US-PATENT-APPL-SN-606988) Avail: NTIS HC/MF A03 CSCL 14B

A high resolution x ray microscope for imaging microscopic structures within biological specimens has an optical system including a highly polished primary and secondary mirror coated with identical multilayer coatings, the mirrors acting at normal incidence. The coatings have a high reflectivity in the narrow wave bandpass between 23.3 and 43.7 angstroms and have low reflectivity outside of this range. The primary mirror has a spherical concave surface and the secondary mirror has a spherical convex surface. The radii of the mirrors are concentric about a common center of curvature on the optical axis of the microscope extending from the object focal plane to the image focal plane. The primary mirror has an annular configuration with a central aperture and the secondary mirror is positioned between the primary mirror and the center of curvature for reflecting radiation through the aperture to a detector. An x ray filter is mounted at the stage end of the microscope, and film sensitive to x rays in the desired band width is mounted in a camera at the image plane of the optical system. The microscope is mounted within a vacuum chamber for minimizing the absorption of x rays in air from a source through the microscope.

NASA



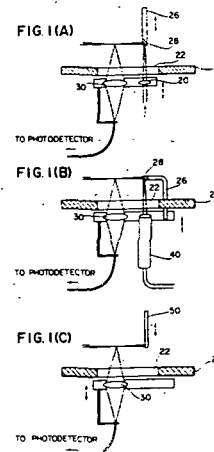
N91-15520*# National Aeronautics and Space Administration, Ames Research Center, Moffett Field, CA.

LASER VELOCIMETER FOR NEAR-SURFACE MEASUREMENTS Patent Application

DENNIS A. JOHNSON, inventor (to NASA) 11 Oct. 1990 18 p (NASA-CASE-ARC-11917-1; NAS 1.71:ARC-11917-1; US-PATENT-APPL-SN-596105) Avail: NTIS HC/MF A03 CSCL 14B

A laser Doppler velocimeter is disclosed for near-wall measurements which includes at least one beam-turning device. The beam-turning device receives laser light, reflects, and redirects the light at various angles in order to obtain measurement for all three velocity components at grazing incident angles. The beam-turning device includes a mirror or prism at one end which reflects the received light in a particular direction. A collector lens receives the particle scattered light from which the relevant velocity components are determined. The beam-turning device can also be a miniature fiber optic head which outputs laser light and can be turned in any direction.

NASA



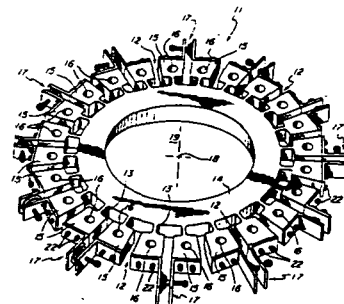
N91-17350* National Aeronautics and Space Administration, Pasadena Office, CA.

TORQUE SENSOR HAVING A SPOKED SENSOR ELEMENT SUPPORT STRUCTURE Patent

BORIS J. LURIE, inventor (to NASA) and **J. ALAN SCHIER**, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 12 Jun. 1990 8 p Filed 21 Mar. 1989 (NASA-CASE-NPO-17461-1-CU; US-PATENT-4,932,270; US-PATENT-APPL-SN-326820; US-PATENT-CLASS-73-862.33; US-PATENT-CLASS-73-862.36; INT-PATENT-CLASS-G01L-3/00) Avail: US Patent and Trademark Office CSCL 14B

Piezoelectric sensor devices are attached across pairs of circularly arranged spokes arrayed on the periphery of an annular ring. The sensor devices each include a preloaded steel ball mounting arrangement for mounting a piezoelectric sensor element. A first circular interface plate on one side of the sensor structure attaches to alternate one of the spokes, and a circular interface plate attaches to the remaining spokes.

Official Gazette of the U.S. Patent and Trademark Office



LASERS AND MASERS

Includes parametric amplifiers.

N91-15528* National Aeronautics and Space Administration. Pasadena Office, CA.

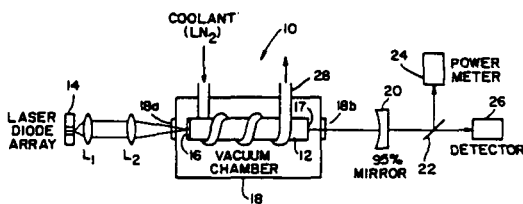
TM,Ho:YLF LASER END-PUMPED BY A SEMICONDUCTOR DIODE LASER ARRAY Patent

HAMID HEMMATI, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 27 Nov. 1990 8 p Filed 23 Aug. 1988

(NASA-CASE-NPO-17282-1-CU; US-PATENT-4,974,230; US-PATENT-APPL-SN-235150; US-PATENT-CLASS-372-41; US-PATENT-CLASS-372-71; US-PATENT-CLASS-372-75; INT-PATENT-CLASS-H01S-3/16) Avail: US Patent and Trademark Office CSCL 20E

An Ho:YLF crystal including Tm as sensitizers for the activator Ho, is optically pumped with a semiconductor diode laser array to generate 2.1 micron radiation with a pump power to output power of efficiency as high as 68 percent. The prior-art dual sensitizer system of Er and Tm requires cooling, such as by LN₂, but by using Tm alone and decreasing the concentrations of Tm and Ho, and decreasing the length of the laser rod to about 1 cm, it has been demonstrated that laser operation can be obtained from a temperature of 77 K with an efficiency as high as 68 percent up to ambient room temperature with an efficiency at that temperature as high as 9 percent.

Official Gazette of the U.S. Patent and Trademark Office



N91-17360*# National Aeronautics and Space Administration. Pasadena Office, CA.

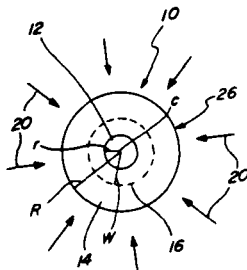
CLADDING FOR TRANSVERSE-PUMPED SOLID-STATE LASER Patent

ROBERT L. BYER, inventor (to NASA) and TSO Y. FAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 22 Aug. 1989 7 p Filed 12 Dec. 1988

(NASA-CASE-NPO-17355-1-CU; US-PATENT-4,860,295; US-PATENT-APPL-SN-283431; US-PATENT-CLASS-372-19; US-PATENT-CLASS-372-39; US-PATENT-CLASS-372-66; US-PATENT-CLASS-372-70; INT-PATENT-CLASS-H01S-3/098) Avail: US Patent and Trademark Office CSCL 20E

In a transverse pumped, solid state laser, a nonabsorptive cladding surrounds a gain medium. A single transverse mode, namely the Transverse Electromagnetic (TEM) sub 00 mode, is provided. The TEM sub 00 model has a cross sectional diameter greater than a transverse dimension of the gain medium but less than a transverse dimension of the cladding. The required size of the gain medium is minimized while a threshold for laser output is lowered.

Official Gazette of the U.S. Patent and Trademark Office



MECHANICAL ENGINEERING

Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.

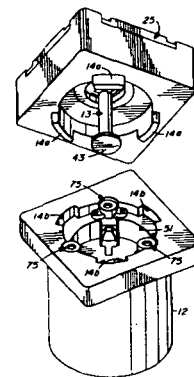
N91-13723*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

TWO FAULT TOLERANT TOGGLE-HOOK RELEASE Patent Application

THOMAS JOSEPH GRAVES, inventor (to NASA) and CHRISTOPHER WILLIAM BROWN, inventor (to NASA) (Boeing Aerospace Co., Seattle, WA.) 25 Oct. 1990 19 p (NASA-CASE-MSC-21671-1; NAS 1.71:MSC-21671-1; US-PATENT-APPL-SN-603337) Avail: NTIS HC/MF A03 CSCL 13I

A coupling device is disclosed which is mechanically two fault tolerant for release. The device comprises a fastener plate and fastener body, each of which is attachable to a different one of a pair of structures to be joined. The fastener plate and body are coupled by an elongate toggle mounted at one end in a socket on the fastener plate for universal pivotal movement thereon. The other end of the toggle is received in an opening in the fastener body and adapted for limited pivotal movement therein. The toggle is adapted to be restrained by three latch hooks arranged in symmetrical equiangular spacing about the axis of the toggle, each hook being mounted on the fastener body for pivotal movement between an unlatching non-contact position with respect to the toggle and a latching position in engagement with a latching surface of the toggle. The device includes releasable lock means for locking each latch hook in its latching position whereby the toggle couples the fastener plate to the fastener body and means for releasing the lock means to unlock each said latch hook from the latch position whereby the unlocking of at least one of the latch hooks from its latching position results in the decoupling of the fastener plate from the fastener body.

NASA



N91-13724*# National Aeronautics and Space Administration. Pasadena Office, CA.

BILEVEL SHARED CONTROL FOR TELEOPERATORS Patent Application

SAMAD A. HAYATI, inventor (to NASA) and SUBRAMANIAN T. VENKATARAMAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 11 May 1990 44 p (Contract NAS7-918)

(NASA-CASE-NPO-17800-1-CU; NAS 1.71:NPO-17800-1-CU; US-PATENT-APPL-SN-522949) Avail: NTIS HC/MF A03 CSCL 13I

A shared system is disclosed for robot control including

integration of the human and autonomous input modalities for an improved control. Autonomously planned motion trajectories are modified by a teleoperator to track unmodeled target motions, while nominal teleoperator motions are modified through compliance to accommodate geometric errors autonomously in the latter. A hierarchical shared system intelligently shares control over a remote robot between the autonomous and teleoperative portions of an overall control system. Architecture is hierarchical, and consists of two levels. The top level represents the task level, while the bottom, the execution level. In space applications, the performance of pure teleoperation systems depend significantly on the communication time delays between the local and the remote sites. Selection/mixing matrices are provided with entries which reflect how each input's signals modality is weighted. The shared control minimizes the detrimental effects caused by these time delays between earth and space.

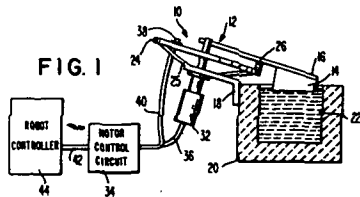
NASA

N91-13729*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

SOLDER DROSS REMOVAL APPARATUS Patent Application
WINSTON S. WEBB, inventor (to NASA) (Honeywell, Inc., Minneapolis, MN.) 16 May 1990 12 p
(NASA-CASE-MFS-28406-1; NAS 1.71:MFS-28406-1;
US-PATENT-APPL-SN-524110) Avail: NTIS HC/MF A03 CSCL 13I

An automatic dross removal apparatus is disclosed for removing dross from the surface of a solder bath in an automated electric component handling system. A rotatable wiper blade is positioned adjacent the solder bath which skims the dross off of the surface prior to the dipping of a robot conveyed component into the bath. An electronic control circuit causes a motor to rotate the wiper arm one full rotational cycle each time a pulse is received from a robot controller as a component approaches the solder bath.

NASA

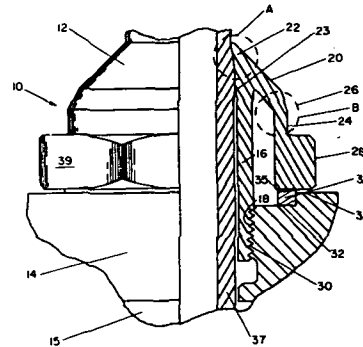


N91-13731*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

CANTILEVER CLAMP FITTING Patent Application
PATRICK B. MELTON, inventor (to NASA) (United Technologies Corp., Huntsville, AL.) 28 Dec. 1989 12 p
(NASA-CASE-MFS-28328-1; NAS 1.71:MFS-28328-1;
US-PATENT-APPL-SN-458065) Avail: NTIS HC/MF A03 CSCL 13I

A device is disclosed for sealing and clamping a cylindrical element which is to be attached to an object such as a wall, a pressurized vessel or another cylindrical element. The device includes a gland having an inner cylindrical wall, which is threaded at one end and is attached at a bendable end to a deformable portion, which in turn is attached to one end of a conical cantilever structure. The other end of the cantilever structure connects at a bendable area to one end of an outer cylindrical wall. The opposite end of cylindrical wall terminates in a thickened portion, the radially outer surface of which is adapted to accommodate a tool for rotating the gland. The terminal end of cylindrical wall also includes an abutment surface, which is adapted to engage a seal, which in turn engages a surface of a receiver. The receiver further includes a threaded portion for engagement with the threaded portion of gland whereby a tightening rotation of gland relative to receiver will cause relative movement between cylindrical walls and of gland. This movement causes a rotation of the conical structure and thus a bending action at bending area and at the bending end of the upper end of inner cylindrical wall. These rotational and bending actions result in a forcing of the deformable portion radially inwardly so as to contact and deform a pipe. This forcible contact creates a seal between gland and pipe, and simultaneously clamps the pipe in position.

NASA

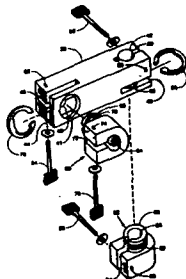


N91-13730*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

POST CLAMP Patent Application
JOHN K. RAMSEY, inventor (to NASA) and ERWIN M. MEYN, inventor (to NASA) 29 Sep. 1989 15 p
(NASA-CASE-LEW-14862-1; NAS 1.71:LEW-14862-1;
US-PATENT-APPL-SN-414816) Avail: NTIS HC/MF A03

A pair of spaced collars are mounted at right angles on a clamp body by retaining rings which enable the collars to rotate with respect to the clamp body. Mounting posts extend through aligned holes in the collars and clamp body. Each collar can be clamped onto the inserted post while the clamp body remains free to rotate about the post and collar. The clamp body is selectively clamped onto each post.

NASA

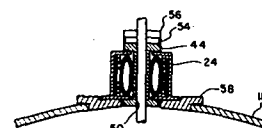


N91-13732*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

PROBE INSERTION APPARATUS WITH INFLATABLE SEAL Patent Application
PAUL A. TRIMARCHI, inventor (to NASA) 23 Aug. 1990 17 p
(NASA-CASE-LEW-14965-1; NAS 1.71:LEW-14965-1;
US-PATENT-APPL-SN-571062) Avail: NTIS HC/MF A03 CSCL 13I

A sealing apparatus is disclosed for inserting a probe into a pressure vessel having an elongated opening includes a pair of resiliently deformable seals oppositely disposed in sealing engagement with each other. A retainer is connected to the pressure vessel around the elongated opening and holds the pair of seals rigidly to the pressure vessel. A wedge is engageable with the pair of seals and carries the probe, for longitudinally translating the probe in pressure vessel.

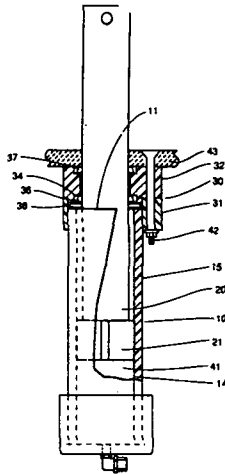
NASA



N91-13733*# National Aeronautics and Space Administration. John C. Stennis Space Center, Bay Saint Louis, MS.
HYDRAULIC LIFTING DEVICE Patent Application
 KYLE TERRELL, inventor (to NASA) (Sverdrup Technology, Inc., Bay Saint Louis, MS.) 28 Jun. 1990 11 p
 (NASA-CASE-SSC-00008-1; NAS 1.71:SSC-00008-1; US-PATENT-APPL-SN-545178) Avail: NTIS HC/MF A03 CSCL 131

A piston and cylinder assembly is disclosed which is constructed of polyvinyl chloride that uses local water pressure to perform small lifting tasks. The chamber is either pressurized to extend the piston or depressurized to retract the piston. The present invention is best utilized for raising and lowering toilet seats.

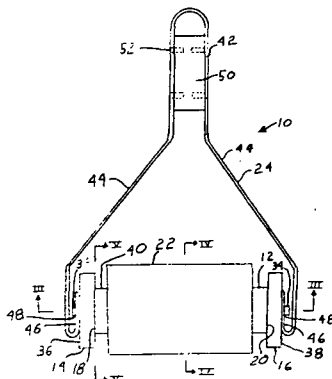
NASA



N91-13734*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
DEVICE FOR APPLYING CONSTANT PRESSURE TO A SURFACE Patent Application
 EVE ABRAMS, inventor (to NASA) 31 May 1990 10 p
 (NASA-CASE-GSC-13230-1; NAS 1.71:GSC-13230-1; US-PATENT-APPL-SN-531374) Avail: NTIS HC/MF A02 CSCL 131

A device for applying constant pressure to a surface is disclosed. The device includes a cylinder having a longitudinal axis greater than the diameter of the cylinder. A first wheel and a second wheel are coupled to each end, respectively, of the cylinder. The wheels have a diameter substantially greater than the diameter of the cylinder. An elastomeric covering surrounds the cylinder. The elastomeric covering has an outer diameter substantially greater than the diameter of the wheels. A handle is coupled to the wheels for rolling and applying pressure to the elastomeric covering.

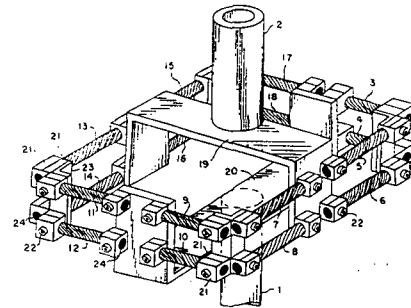
NASA



N91-13735*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
ROBOT CABLE-COMPLIANT DEVICES Patent Application
 JAMES J. KERLEY, JR., inventor (to NASA) 13 May 1988 25 p
 (NASA-CASE-GSC-13127-1; NAS 1.71:GSC-13127-1; US-PATENT-APPL-SN-193612) Avail: NTIS HC/MF A03 CSCL 20E

A cable-compliant robotic joint includes two U configuration cross-section brackets with their U cross-sections lying in different planes, one of the brackets being connected to a robot arm and the other to a tool. Additional brackets are displaced from the other brackets at corners of the robotic joint. All the brackets are connected by cable segments which lie in one or more planes which are perpendicular to the direction of tool travel as it approaches a work object. The compliance of the joint is determined by the cable segment characteristics, such as their length, material, angle, stranding, pre-twisting and pre-stressing.

NASA

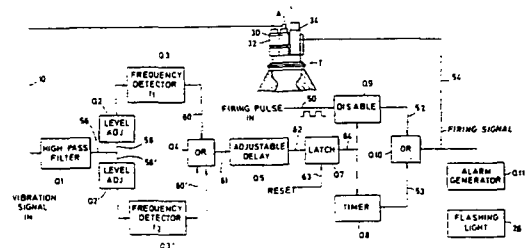


N91-14607* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
VIBRATION ANALYZER Patent

RICHARD J. BOZEMAN, JR., inventor (to NASA) 11 Dec. 1990 9 p Filed 31 Jan. 1989
 (NASA-CASE-MSC-21408-1; US-PATENT-4,977,395; US-PATENT-APPL-SN-304154; US-PATENT-CLASS-340-683; US-PATENT-CLASS-73-658; INT-PATENT-CLASS-G08B-21/00) Avail: US Patent and Trademark Office CSCL 131

The invention relates to monitoring circuitry for the real time detection of vibrations of a predetermined frequency and which are greater than a predetermined magnitude. The circuitry produces an instability signal in response to such detection. The circuitry is particularly adapted for detecting instabilities in rocket thrusters, but may find application with other machines such as expensive rotating machinery, or turbines. The monitoring circuitry identifies when vibration signals are present having a predetermined frequency of a multi-frequency vibration signal which has an RMS energy level greater than a predetermined magnitude. It generates an instability signal only if such a vibration signal is identified. The circuitry includes a delay circuit which responds with an alarm signal only if the instability signal continues for a predetermined time period. When used with a rocket thruster, the alarm signal may be used to cut off the thruster if such thruster is being used in flight. If the circuitry is monitoring tests of the thruster, it generates signals to change the thruster operation, for example, from pulse mode to continuous firing to determine if the instability of the thruster is sustained once it is detected.

Official Gazette of the U.S. Patent and Trademark Office



37 MECHANICAL ENGINEERING

N91-14608* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

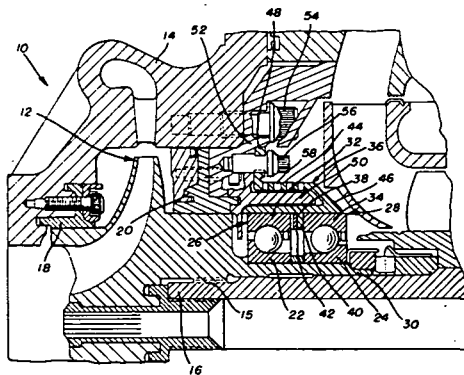
TURBOMACHINERY ROTOR SUPPORT WITH DAMPING Patent

GEORGE L. VONPRAGENAU, inventor (to NASA) 22 May 1990 8 p Filed 26 May 1989

(NASA-CASE-MFS-28345-1; US-PATENT-4,927,326; US-PATENT-APPL-SN-364743; US-PATENT-CLASS-415-170.1; US-PATENT-CLASS-415-174.5; US-PATENT-CLASS-415-229; INT-PATENT-CLASS-F01D-11/08) Avail: US Patent and Trademark Office CSCL 13I

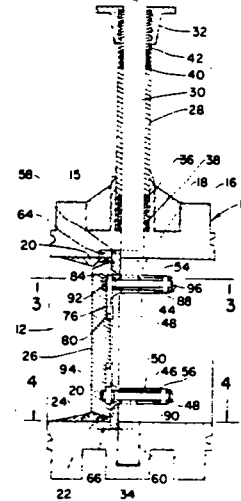
Damping seals, damping bearings, and a support sleeve are presented for the ball bearings of a high speed rotor. The ball bearings consist of a duplex set having the outer races packaged tightly within the sleeve while the sleeve provides a gap with a support member so that the bearings may float with the sleeve. The sleeve has a web extending radially between the pair of outer races and acts in conjunction with one or more springs to apply an axial preload to the outer races. The sleeves have a series of slits which provide the sleeve with a spring-like quality so that the spring acts to center the rotor upon which the bearings are mounted during start up and shut down. A damping seal or a damping bearing may be used in conjunction with the ball bearings and supporting sleeve, the damping seal and damping bearing having rotor portions including rigid outer surfaces mounted within the bore of a stator portion having triangular shaped pockets on the surface facing the rotor. Axial gates are provided between adjacent pockets in sections of the stator permitting fluid to flow with less resistance axially relative to the flow of fluids circumferentially between the rotor and the stator.

Official Gazette of the U.S. Patent and Trademark Office



guide slot having an arcuate portion and a linear portion, and the disk is guided by the guide members guided in the arcuate portion when the disk is fully opened to and until the disk is aligned with the seat, and the guide members are guided by the linear portion of the slot. A portion of each cam is spring biased so that the cams tightly engage follower rollers carried by the brackets during the rotational portion of the movement of the disk.

Official Gazette of the U.S. Patent and Trademark Office



N91-14610* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

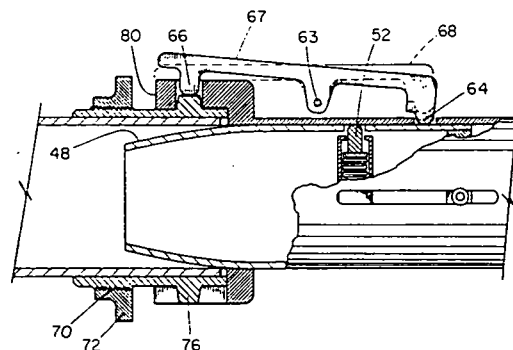
QUICK CONNECT COUPLING Patent

BENNY B. SPRAGUE, inventor (to NASA) 20 Nov. 1990 5 p Filed 30 Mar. 1990

(NASA-CASE-MS-21539-1; US-PATENT-4,971,474; US-PATENT-APPL-SN-503410; US-PATENT-CLASS-403-331; US-PATENT-CLASS-285-327; US-PATENT-CLASS-403-327; US-PATENT-CLASS-403-317; US-PATENT-CLASS-403-381; INT-PATENT-CLASS-B25G-3/00; INT-PATENT-CLASS-F16B-1/00) Avail: US Patent and Trademark Office CSCL 13I

A coupling device has a transversely arranged, open-end groove in a flange attached to a pipe end. The groove in the flange receives a circumferentially arranged locking flange element on the other coupling member and permits alignment of the bores of the coupling members when the locking flange element is in the open end groove. Upon alignment of the bores of the coupling members, a trigger member is activated to automatically release a spring biased tubular member in one of the coupling members. The tubular member has a conical end which is displaced into the other coupling member to lock the coupling members to one another. A tensioning nut is threadedly movable on a coupling member so as to be moved into tightening engagement with the other coupling member.

Official Gazette of the U.S. Patent and Trademark Office



N91-14609* National Aeronautics and Space Administration. John C. Stennis Space Center, Bay Saint Louis, MS.

HYBRID BUTTERFLY VALVE Patent

LAURENCE DEQUAY, inventor (to NASA) 1 May 1990 7 p Filed 7 Sep. 1989

(NASA-CASE-SSC-00004-1; US-PATENT-4,921,212; US-PATENT-APPL-SN-404292; US-PATENT-CLASS-251-163; US-PATENT-CLASS-251-160; INT-PATENT-CLASS-F16K-1/22) Avail: US Patent and Trademark Office CSCL 13I

A hybrid butterfly valve has a stationary seat and a valve closure disk which may rotate together with an actuating shaft from the fully open position to a position wherein the disk is aligned with the seat, and may be moved linearly into a sealing relationship with the seat. The disk is supported by brackets having an elongated slot through which the shaft extends, the brackets being adapted to move linearly relative to the shaft. Cams fastened to the shaft initiate a 90 degree rotation of the disk from the fully open position to the position where the valve disk is aligned with the seat, and the cams act in conjunction with followers carried by the disk to move the disk and the brackets linearly. The disk carries guide members which are positioned in a guide slot, the

N91-14613* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

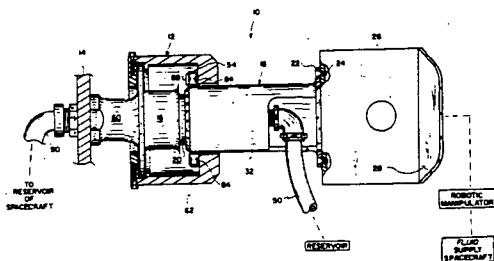
SYSTEM FOR CONNECTING FLUID COUPLINGS Patent

JOSEPH C. CODY, inventor (to NASA) and PAUL R. MATTHEWS, inventor (to NASA) (Spectra Research Systems, Inc., Huntsville, AL.) 12 Jun. 1990 7 p Filed 29 Feb. 1988

(NASA-CASE-MFS-26042-1-SB; US-PATENT-4,932,688; US-PATENT-APPL-SN-161682; US-PATENT-CLASS-285-82; US-PATENT-CLASS-285-361; INT-PATENT-CLASS-F16L-35/00) Avail: US Patent and Trademark Office CSCL 131

A system for mating fluid transfer couplings is constructed having a male connector which is provided with a pair of opposed rollers mounted to an exterior region thereof. A male half of a fluid transfer coupling is rotatably supported in an opening in an end of the connector and is equipped with an outwardly extending forward portion. The forward portion locks into an engagement and locking region of a female half of the fluid transfer coupling, with female half being rotatably supported in a receptacle. The receptacle has an opening aligned with locking region, with this opening having a pair of concentric, annularly disposed ramps extending around an interior portion of opening. These ramps are inclined toward the interior of the receptacle and are provided with slots through which rollers of the connector pass. After the connector is inserted into the receptacle (engaging forward portion into engagement region), relative rotation between the connector and receptacle causes the rollers to traverse ramps until the rollers abut and are gripped by retainers. This axially forces the forward portion into locked, sealed engagement with the engagement region.

Official Gazette of the U.S. Patent and Trademark Office



N91-14614* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

MECHANICAL END JOINT SYSTEM FOR CONNECTING STRUCTURAL COLUMN ELEMENTS Patent

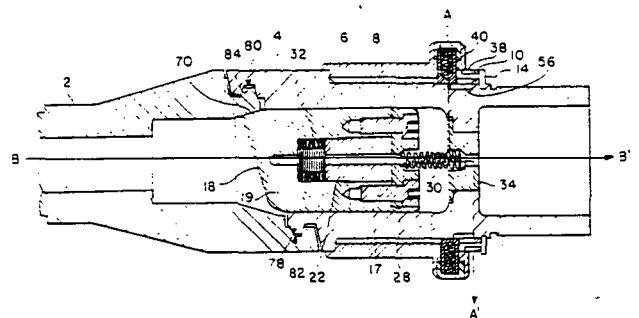
HAROLD G. BUSH, inventor (to NASA), MARTIN M. MIKULAS, JR., inventor (to NASA), and RICHARD E. WALLSOM, inventor (to NASA) 16 Oct. 1990 12 p Filed 30 Mar. 1990 Continuation-in-part of abandoned US-Patent-Appl-SN-388264, filed 1 Aug. 1989 which is a continuation-in-part of abandoned US-Patent-Appl-SN-223122, filed 22 Jul. 1988

(NASA-CASE-LAR-14465-1; US-PATENT-4,963,052; US-PATENT-APPL-SN-501910; US-PATENT-APPL-SN-388264; US-PATENT-APPL-SN-223122; US-PATENT-CLASS-403-322; US-PATENT-CLASS-403-327; US-PATENT-CLASS-403-331; US-PATENT-CLASS-403-171; INT-PATENT-CLASS-B25G-3/18) Avail: US Patent and Trademark Office CSCL 131

A mechanical end joint system is presented that eliminates the possibility of free movements between the joint halves during loading or vibration. Both node joint body (NJB) and column end joint body (CEJB) have cylindrical engaging ends. Each of these ends has an integral semicircular tongue and groove. The two joint halves are engaged transversely - the tongue of the NJB

mating with the groove of the CEJB and vice versa. The joint system employs a spring loaded internal latch mechanism housed in the CEJB. During mating, this mechanism is pushed away from the NJB and enters the NJB when mating is completed. In order to lock the joint and add a preload across the tongue and groove faces, an operating ring collar is rotated through 45 deg causing an internal mechanism to compress a Belleville washer preload mechanism. This causes an equal and opposite force to be exerted on the latch bolt and the latch plunger. This force presses the two joint halves tightly together. In order to prevent inadvertent disassembly, a secondary lock is also engaged when the joint is closed. Plungers are carried in the operating ring collar. When the joint is closed, the plungers fall into tracks on the CEJB, which allows the joint to be opened only when the operating ring collar and plungers are pushed directly away from the joining end. One application of this invention is the rapid assembly and disassembly of diverse skeletal framework structures which is extremely important in many projects involving the exploration of space.

Official Gazette of the U.S. Patent and Trademark Office



N91-14615* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

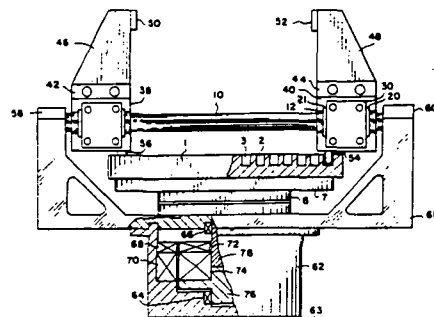
SPIRAL LEAD PLATEN ROBOTIC END EFFECTOR Patent

DAVID C. BEALS, inventor (to NASA) 11 Sep. 1990 7 p Filed 28 Sep. 1988

(NASA-CASE-LAR-13855-1; US-PATENT-4,955,653; US-PATENT-APPL-SN-250662; US-PATENT-CLASS-294-119.1; US-PATENT-CLASS-901-38; US-PATENT-CLASS-901-39; INT-PATENT-CLASS-B25J-15/08) Avail: US Patent and Trademark Office CSCL 131

A robotic end effector is disclosed which makes use of a rotating platen with spiral leads used to impact lateral motion to gripping fingers. Actuation is provided by the contact of rolling pins with the walls of the leads. The use of the disclosed method of actuation avoids jamming and provides excellent mechanical advantage while remaining light in weight and durable. The entire end effector is compact and easily adapted for attachment to robotic arms currently in use.

Official Gazette of the U.S. Patent and Trademark Office



.37 MECHANICAL ENGINEERING

N91-14616* National Aeronautics and Space Administration. Pasadena Office, CA.

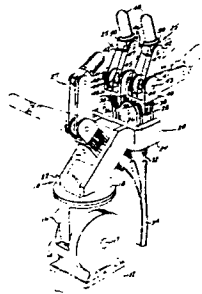
MULTI-FINGERED ROBOTIC HAND Patent

CARL F. RUOFF, inventor (to NASA) and KENNETH SALISBURY, JR., inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 1 May 1990 10 p Filed 12 Dec. 1984 Continuation of abandoned US-Patent-Appl-SN-364774, filed 2 Apr. 1982

(NASA-CASE-NPO-15959-2; US-PATENT-4,921,293; US-PATENT-APPL-SN-680605; US-PATENT-APPL-SN-364774; US-PATENT-CLASS-294-111; US-PATENT-CLASS-74-479; US-PATENT-CLASS-74-665G; US-PATENT-CLASS-294-106; US-PATENT-CLASS-414-7; US-PATENT-CLASS-414-729) Avail: US Patent and Trademark Office CSCL 131

A robotic hand is presented having a plurality of fingers, each having a plurality of joints pivotally connected one to the other. Actuators are connected at one end to an actuating and control mechanism mounted remotely from the hand and at the other end to the joints of the fingers for manipulating the fingers and passing externally of the robot manipulating arm in between the hand and the actuating and control mechanism. The fingers include pulleys to route the actuators within the fingers. Cable tension sensing structure mounted on a portion of the hand are disclosed, as is covering of the tip of each finger with a resilient and pliable friction enhancing surface.

Official Gazette of the U.S. Patent and Trademark Office



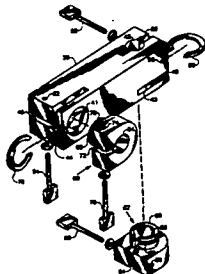
N91-14617* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

POST CLAMP Patent

JOHN K. RAMSEY, inventor (to NASA) and ERWIN H. MEYN, inventor (to NASA) 7 Aug. 1990 9 p Filed 29 Sep. 1989 (NASA-CASE-LEW-14862-1; US-PATENT-4,946,122; US-PATENT-APPL-SN-414816; US-PATENT-CLASS-248-229; US-PATENT-CLASS-248-230; US-PATENT-CLASS-403-385; US-PATENT-CLASS-403-391; INT-PATENT-CLASS-F16M-13/00) Avail: US and Trademark Office CSCL 131

A pair of spaced collars are mounted at right angles on a clamp body by retaining rings which enable the collars to rotate with respect to the clamp body. Mounting posts extend through aligned holes in the collars and clamp body. Each collar can be clamped onto the inserted post while the clamp body remains free to rotate about the post and collar. The clamp body is selectively clamped onto each post.

Official Gazette of the U.S. Patent and Trademark Office



N91-15544* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

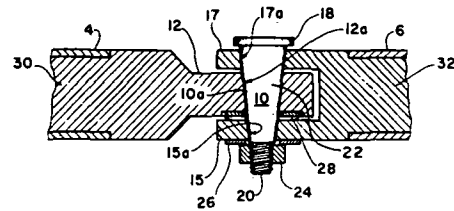
CLEVIS JOINT FOR DEPLOYABLE SPACE STRUCTURES Patent

MARVIN D. RHODES, inventor (to NASA) 12 Jun. 1990 6 p Filed 28 Jul. 1988

(NASA-CASE-LAR-13898-1; US-PATENT-4,932,807; US-PATENT-APPL-SN-225427; US-PATENT-CLASS-403-147; US-PATENT-CLASS-403-146; US-PATENT-CLASS-403-156; US-PATENT-CLASS-403-334; INT-PATENT-CLASS-F16C-11/00) Avail: US Patent and Trademark Office CSCL 131

This invention relates generally to pin clevis joints, and more particularly, to zero play pin clevis joints for connecting structural members of a deployable space structure. A joint includes a pin, a tang, and a shackle. The pin is tapered at the same angle as the bores extending through the projections of the shackle and the tang. A spring washer biases the tang onto the tapered sidewall of the pin. The invention solves the free play problem associated with deployable space structures by using a tapered pin which is held in tapered holes by the spring washers.

Official Gazette of the U.S. Patent and Trademark Office



N91-15556*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

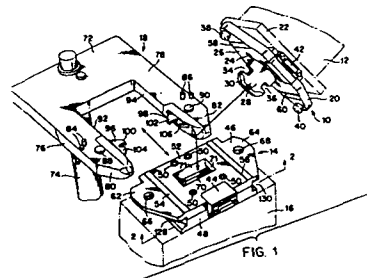
ROBOTIC TOOL CHANGE MECHANISM Patent Application

GEORGE M. VOELLMER, inventor (to NASA) 2 Nov. 1990 19 p

(NASA-CASE-GSC-13239-1; NAS 1.71:GSC-13239-1; US-PATENT-APPL-SN-608657) Avail: NTIS HC/MF A03 CSCL 131

An assembly of three major components is disclosed which included a wrist interface plate which is secured to the wrist joint of a robotic arm, a tool interface plate which is secured to each tool intended for use by the robotic arm, and a tool holster for each tool attached to the interface plate. The wrist interface plate and a selected tool interface plate are mutually connectable together through an opening or recess in the upper face of the interface plate by means of a notched tongue protruding from the front face of the wrist interface plate which engages a pair of spring-biased rotatable notched wheels located within the body of the tool interface plate. The tool holster captures and locks onto the tool interface plate by means of a pair of actuation claws including a locking tab and an unlocking wedge which operate respective actuation bosses on each of the notched wheels in response to a forward and backward motion of the tool interface plate as a result of motion of the robotic arm to either park the tool or use the tool.

NASA



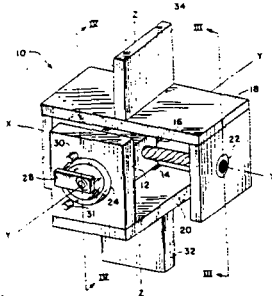
N91-17387* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

COMPLIANT JOINT Patent

WAYNE D. EKLUND, inventor (to NASA) and JAMES J. KERLEY, inventor (to NASA) 12 Jun. 1990 9 p Filed 21 Mar. 1989 (NASA-CASE-GSC-13153-1; US-PATENT-4,932,806; US-PATENT-APPL-SN-326863; US-PATENT-CLASS-403-57; US-PATENT-CLASS-403-113; US-PATENT-CLASS-403-291; US-PATENT-CLASS-464-56; US-PATENT-CLASS-464-132; INT-PATENT-CLASS-F16D-3/02) Avail: US Patent and Trademark Office CSCL 131

A compliant joint is provided for prosthetic and robotic devices which permits rotation in three different planes. The joint provides for the controlled use of cable under motion. Perpendicular outer mounting frames are joined by swaged cables that interlock at a center block. Ball bearings allow for the free rotation of the second mounting frame relative to the first mounting frame within a predetermined angular rotation that is controlled by two stop devices. The cables allow for compliance at the stops and the cables allow for compliance in six degrees of freedom enabling the duplication or simulation of the rotational movement and flexibility of a natural hip or knee joint, as well as the simulation of a joint designed for a specific robotic component for predetermined design parameters.

Official Gazette of the U.S. Patent and Trademark Office



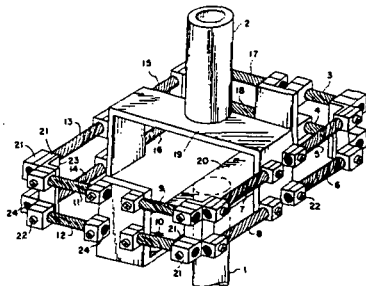
N91-17388* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

ROBOT CABLE-COMPLIANT DEVICES Patent

JAMES J. KERLEY, JR., inventor (to NASA) 7 Aug. 1990 17 p Filed 13 May 1988 (NASA-CASE-GSC-13127-1; US-PATENT-4,946,421; US-PATENT-APPL-SN-193612; US-PATENT-CLASS-464-56; US-PATENT-CLASS-901-28; INT-PATENT-CLASS-F16D-3/50) Avail: US Patent and Trademark Office CSCL 131

A cable compliant robotic joint includes two U configuration cross section brackets with their U cross sections lying in different planes, one of their brackets being connected to a robot arm and the other to a tool. Additional angle brackets are displaced from the other brackets at corners of the robotic joint. All the brackets are connected by cable segments which lie in one or more planes which are perpendicular to the direction of tool travel as it approaches a work object. The compliance of the joint is determined by the cable segment characteristics, such as their length, material, angle, stranding, pretwisting, and prestressing.

Official Gazette of the U.S. Patent and Trademark Office



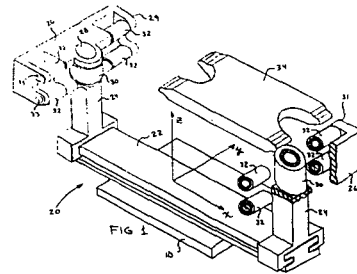
N91-17401*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

ROLLING FRICTION ROBOT FINGERS Patent Application

JOHN M. VRANISH, inventor (to NASA) 17 Dec. 1990 48 p (NASA-CASE-GSC-13261-1; NAS 1.71:GSC-13261-1; US-PATENT-APPL-SN-628529) Avail: NTIS HC/MF A03 CSCL 131

A low friction, object guidance, and gripping finger device for a robotic end effector on a robotic arm is disclosed, having a pair of robotic fingers each having a finger shaft slideably located on a gripper housing attached to the end effector. Each of the robotic fingers has a roller housing attached to the finger shaft. The roller housing has a ball bearing mounted centering roller located at the center, and a pair of ball bearing mounted clamping rollers located on either side of the centering roller. The object has a recess to engage the centering roller and a number of seating ramps for engaging the clamping rollers. The centering roller acts to position and hold the object symmetrically about the centering roller with respect to the X axis and the clamping rollers act to position and hold the object with respect to the Y and Z axis.

NASA



39

STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

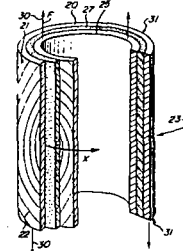
N91-13767*# National Aeronautics and Space Administration. Pasadena Office, CA.

COMPOSITE PASSIVE DAMPING STRUTS FOR LARGE PRECISION STRUCTURES Patent Application

BENJAMIN P. DOLGIN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 31 Aug. 1990 16 p (Contract NAS7-918) (NASA-CASE-NPO-17914-1-CU; NAS 1.71:NPO-17914-1-CU; US-PATENT-APPL-SN-575697) Avail: NTIS HC/MF A03 CSCL 20K

In the field of viscoelastic dampers, a new strut design comprises a viscoelastic material sandwiched between multiple layers, some of which layers bear and dampen load force. In one embodiment, the layers are composite plies of opposing orientation. In another embodiment, the strut utilizes a viscoelastic layer sandwiched between V-shaped composite plies. In a third embodiment, a viscoelastic layer is sandwiched between sine-shaped plies. Strut strength is equal to or greater than conventional aluminum struts due to the unique high interlaminar shear ply design.

NASA



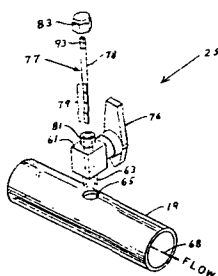
EARTH RESOURCES AND REMOTE SENSING

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

N91-13787*# National Aeronautics and Space Administration. Pasadena Office, CA.

SYSTEM AND METHOD FOR MEASURING OCEAN SURFACE CURRENTS AT LOCATIONS REMOTE FROM LAND MASSES USING SYNTHETIC APERTURE RADAR Patent Application
LAWRENCE E. YOUNG, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 14 Mar. 1990 22 p (Contract NAS7-918)
(NASA-CASE-NPO-17937-1-CU; NAS 1.71:NPO-17937-1-CU; US-PATENT-APPL-SN-493190) Avail: NTIS HC/MF A03 CSCL 08F

A system for measuring ocean surface currents from an airborne platform is disclosed. A radar system having two spaced antennas wherein one antenna is driven and return signals from the ocean surface are detected by both antennas is employed to get raw ocean current data which are saved for later processing. There are a pair of global positioning system (GPS) systems including a first antenna carried by the platform at a first location and a second antenna carried by the platform at a second location displaced from the first antenna for determining the position of the antennas from signals from orbiting GPS navigational satellites. Data are also saved for later processing. The saved data are subsequently processed by a ground-based computer system to determine the position, orientation, and velocity of the platform as well as to derive measurements of currents on the ocean surface.



NASA

N91-14642* National Aeronautics and Space Administration. Pasadena Office, CA.

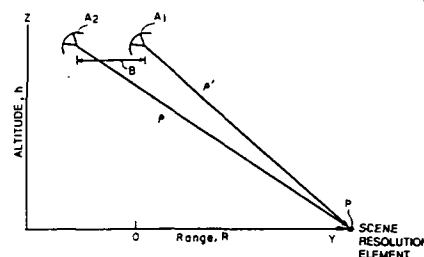
METHOD FOR DETECTING SURFACE MOTIONS AND MAPPING SMALL TERRESTRIAL OR PLANETARY SURFACE DEFORMATIONS WITH SYNTHETIC APERTURE RADAR Patent

ANDREW K. GABRIEL, inventor (to NASA), RICHARD M. GOLDSTEIN, inventor (to NASA), and HOWARD A. ZEBKER, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 4 Dec. 1990 9 p Filed 26 Jan. 1990
(NASA-CASE-NPO-17831-1-CU; US-PATENT-4,975,704; US-PATENT-APPL-SN-470665; US-PATENT-CLASS-342-25; INT-PATENT-CLASS-G01S-13/90) Avail: US Patent and Trademark Office CSCL 08B

A technique based on synthetic aperture radar (SAR) interferometry is used to measure very small (1 cm or less) surface deformations with good resolution (10 m) over large areas (50 km). It can be used for accurate measurements of many geophysical phenomena, including swelling and buckling in fault zones, residual, vertical and lateral displacements from seismic events, and prevolcanic swelling. Two SAR images are made of a scene by two spaced antennas and a difference interferogram of the scene is made. After unwrapping phases of pixels of the difference interferogram, surface motion or deformation changes

of the surface are observed. A second interferogram of the same scene is made from a different pair of images, at least one of which is made after some elapsed time. The second interferogram is then compared with the first interferogram to detect changes in line of sight position of pixels. By resolving line of sight observations into their vector components in other sets of interferograms along at least one other direction, lateral motions may be recovered in their entirety. Since in general, the SAR images are made from flight tracks that are separated, it is not possible to distinguish surface changes from the parallax caused by topography. However, a third image may be used to remove the topography and leave only the surface changes.

Official Gazette of the U.S. Patent and Trademark Office



ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower.

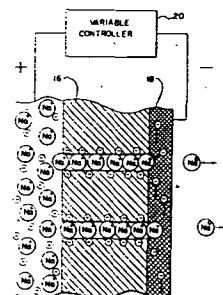
N91-13796*# National Aeronautics and Space Administration. Pasadena Office, CA.

THERMAL POWER TRANSFER SYSTEM USING APPLIED POTENTIAL DIFFERENCE TO SUSTAIN OPERATING PRESSURE DIFFERENCE Patent Application

PRADEEP BHANDARI, inventor (to NASA) and TOSHIO FUJITA, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 16 Aug. 1990 14 p (Contract NAS7-918)
(NASA-CASE-NPO-18034-1-CU; NAS 1.71:NPO-18034-1-CU; US-PATENT-APPL-SN-568130) Avail: NTIS HC/MF A03 CSCL 10B

A thermal power transfer system using a phase change liquid gas fluid in a closed loop configuration has a heat exchanger member connected to a gas conduit for inputting thermal energy into the fluid. The pressure in the gas conduit is higher than a liquid conduit that is connected to a heat exchanger member for outputting thermal energy. A solid electrolyte member acts as a barrier between the gas conduit and the liquid conduit adjacent a solid electrolyte member. The solid electrolyte member has the capacity of transmitting ions of a fluid through the electrolyte member. The ions can be recombined with electrons with the assistance of a porous electrode. An electrical field is applied across the solid electrolyte member to force the ions of the fluid from a lower pressure liquid conduit to the higher pressure gas conduit.

NASA



ENVIRONMENT POLLUTION

Includes atmospheric, noise, thermal, and water pollution.

N91-14662* National Aeronautics and Space Administration. John C. Stennis Space Center, Bay Saint Louis, MS.

COMBINED AIR AND WATER POLLUTION CONTROL SYSTEM Patent

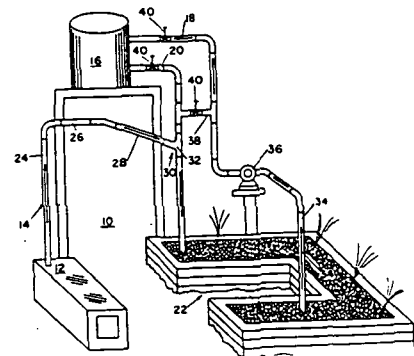
BILLY C. WOLVERTON, inventor (to NASA) and LAMONT JARRELL, inventor (to NASA) 25 Sep. 1990 8 p Filed 26 May 1989

(NASA-CASE-NST-00007-1; US-PATENT-4,959,084; US-PATENT-APPL-SN-357938; US-PATENT-CLASS-55-68; US-PATENT-CLASS-55-74; US-PATENT-CLASS-55-84; US-PATENT-CLASS-55-89; US-PATENT-CLASS-55-228; US-PATENT-CLASS-55-242; US-PATENT-CLASS-210-615)

Avail: US Patent and Trademark Office CSCL 13B

A bioaquatic air pollution control system for controlling both water and atmospheric pollution is disclosed. The pollution control system includes an exhaust for directing polluted gases out of a furnace and a fluid circulating system which circulates fluid, such as waste water, from a source, past the furnace where the fluid flow entrains the pollutants from the furnace. The combined fluid and pollutants are then directed through a rock/plant/microbial filtering system. A suction pump pumps the treated waste water from the filter system past the exhaust to again entrain more pollutants from the furnace where they are combined with the fluid (waste water) and directed to the filter system.

Official Gazette of the U.S. Patent and Trademark Office



METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N91-15661* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

METHOD AND APPARATUS FOR DETERMINING RETURN STROKE POLARITY OF DISTANT LIGHTNING Patent Application

RICHARD J. BLAKESLEE, inventor (to NASA) (New Mexico Inst. of Mining and Technology, Socorro.) and MARX BROOK, inventor (to NASA) 28 Aug. 1990 16 p

(NASA-CASE-MFS-26102-1-CU; NAS 1.71:MFS-26102-1-CU; US-PATENT-APPL-SN-571687) Avail: NTIS HC/MF A03 CSCL 04B

A method is described for determining the return stroke polarity

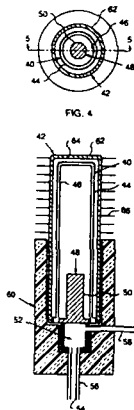
N91-13802* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

SMALL PARTICLE SELECTIVE EMITTER Patent Application

DONALD L. CHUBB, inventor (to NASA) 30 Mar. 1990 14 p (NASA-CASE-LEW-14731-1; NAS 1.71:LEW-14731-1; US-PATENT-APPL-SN-503486) Avail: NTIS HC/MF A03 CSCL 10C

This invention relates to a small particle selective emitter for converting thermal energy into narrow band radiation with high efficiency. The small particle selective emitter is used in combination with a photovoltaic array to provide a thermal to electrical energy conversion device. An energy conversion apparatus of this type is called a thermo-photovoltaic device. In the first embodiment, small diameter particles of a rare earth oxide are suspended in an inert gas enclosed between concentric cylinders. The rare earth oxides are used because they have the desired property of large emittance in a narrow wavelength band and small emittance outside the band. However, it should be emphasized that it is the smallness of the particles that enhances the radiation property. The small particle selective emitter is surrounded by a photovoltaic array. In an alternate embodiment, the small particle gas mixture is circulated through a thermal energy source. This thermal energy source can be a nuclear reactor, solar receiver, or combustor of a fossil fuel.

NASA



N91-13803* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

THIN SOLAR CELL AND LIGHTWEIGHT ARRAY Patent Application

HENRY W. BRANDHORST, inventor (to NASA) and IRVING WEINBERG, inventor (to NASA) 20 Mar. 1990 14 p (NASA-CASE-LEW-14959-1; NAS 1.71:LEW-14959-1; US-PATENT-APPL-SN-495969) Avail: NTIS HC/MF A03 CSCL 10A

A thin, lightweight solar cell utilizes front contact metallization. Both the front light receiving surface of the solar cell and the facing surface of the cover glass are recessed to accommodate this metallization. This enables the two surfaces to meet flush for an optimum seal.

NASA

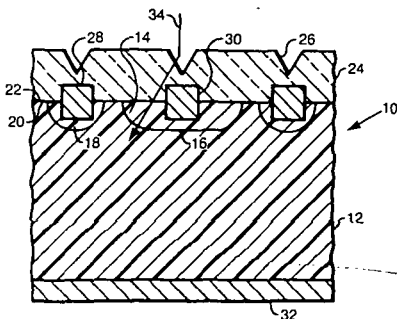
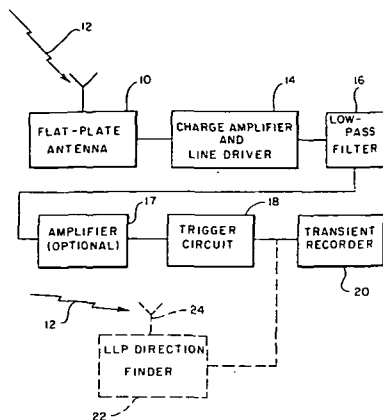


FIG. 1

51 LIFE SCIENCES (GENERAL)

of distant lightning for distances beyond 600 km by detecting the electric field associated with a return stroke of distant lightning, and processing the electric field signal to determine the polarity of the slow tail of the VLF waveform signal associated with the detected electric field. The polarity of the return stroke of distant lightning is determined based upon the polarity of the slow tail portion of the waveform.

NASA



51

LIFE SCIENCES (GENERAL)

N91-13857*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
BIOFILM MONITORING COUPON SYSTEM Patent Application
 RICHARD L. SAUER, inventor (to NASA) and DAVID T. FLANAGAN, inventor (to NASA) (Krug International, Houston, TX.) 14 Mar. 1990 15 p
 (NASA-CASE-MSC-21585-1; NAS 1.71:MSC-21585-1; US-PATENT-APPL-SN-493529) Avail: NTIS HC/MF A03 CSCL 06C

An apparatus and method is disclosed for biofilm monitoring of a water distribution system which includes the mounting of at least one fitting in a wall port of a manifold in the water distribution system with a passage through the fitting in communication. The insertion of a biofilm sampling member is through the fitting with planar sampling surfaces of different surface treatment provided on linearly arrayed sample coupons of the sampling member disposed in the flow stream in edge-on parallel relation to the direction of the flow stream of the manifold under fluid-tight sealed conditions. The sampling member is adapted to be aseptically removed from or inserted in the fitting and manifold under a positive pressure condition and the fitting passage sealed immediately thereafter by appropriate closure means so as to preclude contamination of the water distribution system through the fitting. The apparatus includes means for clamping the sampling member and for establishing electrical continuity between the sampling surfaces and the system for minimizing electropotential effects. The apparatus may also include a plurality of fittings and sampling members mounted on the manifold to permit extraction of the sampling members in a timed sequence throughout the monitoring period.

NASA

N91-13860*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

THREE-DIMENSIONAL CELL TO TISSUE ASSEMBLY PROCESS Patent Application

DAVID A. WOLF, inventor (to NASA), RAY P. SCHWARZ, inventor (to NASA), MARIAN L. LEWIS, inventor (to NASA), JOHN H. CROSS, inventor (to NASA), and MARY H. HULS, inventor (to NASA) (Krug International, Houston, TX.) 2 Mar. 1989 55 p
 (NASA-CASE-MSC-21559-1; NAS 1.71:MSC-21559-1; US-PATENT-APPL-SN-317776) Avail: NTIS HC/MF A04 CSCL 06C

The present invention relates a 3-dimensional cell to tissue and maintenance process, more particularly to methods of culturing cells in a culture environment, either in space or in a gravity field, with minimum fluid shear stress, freedom for 3-dimensional spatial orientation of the suspended particles and localization of particles with differing or similar sedimentation properties in a similar spatial region.

NASA

N91-14703* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

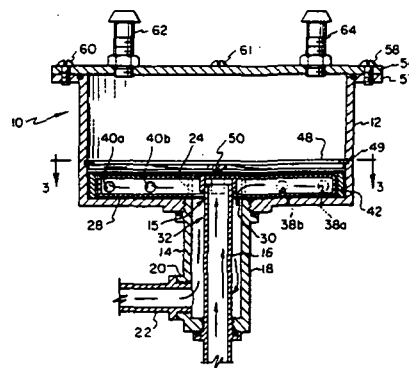
BIO-REACTOR CHAMBER Patent

JOSEPH A. CHANDLER, inventor (to NASA) 13 Jun. 1989 8 p
 Filed 20 Aug. 1987

(NASA-CASE-MSC-20929-1; US-PATENT-4,839,046; US-PATENT-APPL-SN-087358; US-PATENT-CLASS-210-355; US-PATENT-CLASS-210-414; US-PATENT-CLASS-435-311; US-PATENT-CLASS-435-316; INT-PATENT-CLASS-B01D-29/04; INT-PATENT-CLASS-B01D-29/42) Avail: US Patent and Trademark Office CSCL 06B

A bioreactor for cell culture is disclosed which provides for the introduction of fresh medium without excessive turbulent action. The fresh medium enters the bioreactor through a filter with a backwash action which prevents the cells from settling on the filter. The bioreactor is sealed and depleted medium is forced out of the container as fresh medium is added.

Official Gazette of the U.S. Patent and Trademark Office



N91-17531*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

A CULTURE VESSEL WITH LARGE PERFUSION AREA TO VOLUME RATIO Patent Application

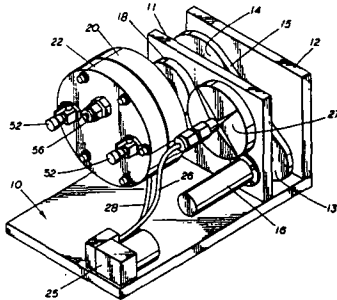
DAVID A. WOLF, inventor (to NASA), CLARENCE F. SAMS, inventor (to NASA), and RAY P. SCHWARZ, inventor (to NASA) 11 Dec. 1990 25 p

(NASA-CASE-MSC-21662-1; NAS 1.71:MSC-21662-1; US-PATENT-APPL-SN-625345) Avail: NTIS HC/MF A03

CSCL 06C

An improved bio-reactor vessel and system useful for carrying out mammalian cell growth in suspension in a culture media are presented. The main goal of the invention is to grow and maintain cells under a homogeneous distribution under acceptable biochemical environment of gas partial pressures and nutrient levels without introducing direct agitation mechanisms or associated disruptive mechanical forces. The culture chamber rotates to maintain an even distribution of cells in suspension and minimizes the length of a gas diffusion path. The culture chamber design is presented and discussed.

NASA



52

AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

N91-13865*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

PORTABLE DYNAMIC FUNDUS INSTRUMENT Patent Application

GERALD TAYLOR, inventor (to NASA), RICHARD MEEHAN, inventor (to NASA), NORWOOD HUNTER, inventor (to NASA), MICHAEL CAPUTO, inventor (to NASA) (Krug International, Houston, TX.), and C. ROBERT GIBSON, inventor (to NASA) 29 Jun. 1990 21 p

(NASA-CASE-MSC-21675-1; NAS 1.71:MSC-21675-1; US-PATENT-APPL-SN-562095) Avail: NTIS HC/MF A03 CSCL 06C

A portable diagnostic image analysis instrument is disclosed for retinal funduscopy in which an eye fundus image is optically processed by a lens system to a CCD device which produces recordable and viewable output data and is simultaneously viewable on an electronic view finder. The fundus image is processed to develop a representation of the vessel or vessels from the output data.

NASA

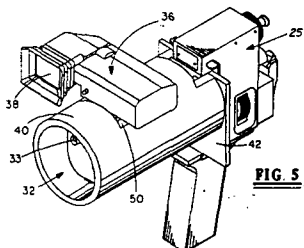


FIG. 5

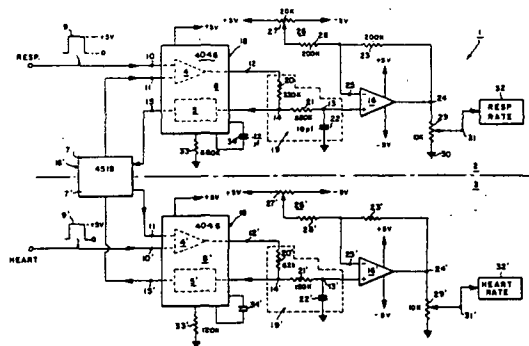
N91-14709* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

DUAL PHYSIOLOGICAL RATE MEASUREMENT INSTRUMENT Patent

TOMMY G. COOPER, inventor (to NASA) 26 Jun. 1990 6 p Filed 15 Apr. 1988 Continuation of abandoned US-Patent-App-SN-585627, filed 7 Mar. 1984 which is a continuation of US-Patent-App-SN-394343, filed 1 Jul. 1982 (NASA-CASE-MSC-20078-3; US-PATENT-4,936,309; US-PATENT-APPL-SN-183475; US-PATENT-APPL-SN-585627; US-PATENT-APPL-SN-394343; US-PATENT-CLASS-128-671; US-PATENT-CLASS-128-689; US-PATENT-CLASS-128-706; US-PATENT-CLASS-128-716; US-PATENT-CLASS-331-1) Avail: US Patent and Trademark Office CSCL 06E

The object of the invention is to provide an instrument for converting a physiological pulse rate into a corresponding linear output voltage. The instrument which accurately measures the rate of an unknown rectangular pulse wave over an extended range of values comprises a phase-locked loop including a phase comparator, a filtering network, and a voltage-controlled oscillator, arranged in cascade. The phase comparator has a first input responsive to the pulse wave and a second input responsive to the output signal of the voltage-controlled oscillator. The comparator provides a signal dependent on the difference in phase and frequency between the signals appearing on the first and second inputs. A high-input impedance amplifier accepts an output from the filtering network and provides an amplified output DC signal to a utilization device for providing a measurement of the rate of the pulse wave.

Official Gazette of the U.S. Patent and Trademark Office



54

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N91-13879*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

EMU HELMET MOUNTED DISPLAY Patent Application

JOSE MARMOLEJO, inventor (to NASA), STEPHEN SMITH, inventor (to NASA), ALAN PLOUGH, inventor (to NASA), ROBERT CLARKE, inventor (to NASA), WILLIAM MCLEAN, inventor (to NASA), and JOSEPH FOURNIER, inventor (to NASA) (Hamilton Standard, Windsor Locks, CT.) 25 Sep. 1990 14 p

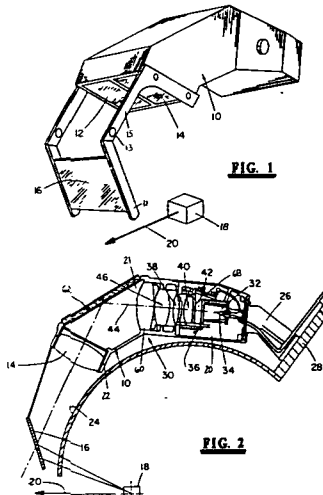
(NASA-CASE-MSC-21460-1; NAS 1.71:MSC-21460-1; US-PATENT-APPL-SN-587919) Avail: NTIS HC/MF A03 CSCL 05H

A helmet mounted display device is disclosed for projecting a

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

display on a flat combiner surface located above the line of sight where the display is produced by two independent optical channels with independent LCD image generators. The display has a fully overlapped field of view on the combiner surface and the focus can be adjusted from a near field of four feet to infinity.

NASA



N91-14723* National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, TX.

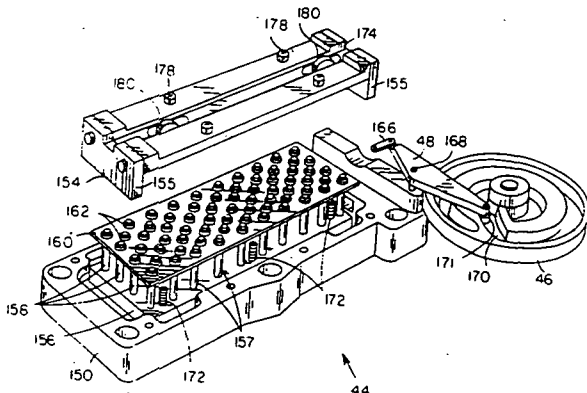
VALVE FOR WASTE COLLECTION AND STORAGE Patent

WILLIAM E. THORNTON, JR., inventor (to NASA) and HENRY B. WHITMORE, inventor (to NASA) 3 Jul. 1990 15 p Filed 10 Aug. 1989 Division of US-Patent-Appl-SN-035401, filed 7 Apr. 1989

(NASA-CASE-MS-C-21025-4; US-PATENT-4,937,891; US-PATENT-APPL-SN-392228; US-PATENT-APPL-SN-035401; US-PATENT-CLASS-4-209R; US-PATENT-CLASS-4-482; US-PATENT-CLASS-4-316; INT-PATENT-CLASS-E03D-9/04) Avail: US Patent and Trademark Office CSCL 06K

A method and valve apparatus for collection of fecal matter designed to operate efficiently in a zero gravity environment is presented. The system comprises a waste collection area within a body having a seat opening. Low pressure within the waste collection area directs fecal matter away from the user's buttocks and prevents the escape of undesirable gases. The user actuates a piston covered with an absorbent pad that sweeps through the waste collection area to collect the fecal matter, scrub the waste collection area, press the waste against an end of the waste collection area and retracts, leaving the used pad. Multiple pads are provided on the piston to accommodate multiple uses of the system. Also a valve allows air to be drawn through the body, so the valve will not be plugged with fecal matter. A sheet feeder feeds fresh sheets of absorbent pads to a face of the piston with each actuation.

Official Gazette of the U.S. Patent and Trademark Office



N91-14724* National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, TX.

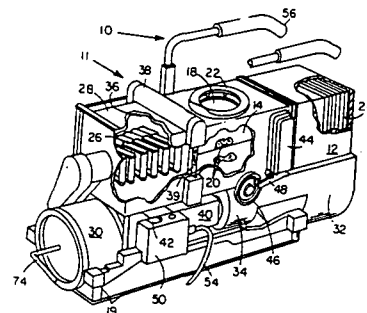
METHOD FOR WASTE COLLECTION AND STORAGE Patent

WILLIAM E. THORNTON, JR., inventor (to NASA) and HENRY B. WHITMORE, inventor (to NASA) 24 Jul. 1990 15 p Filed 10 Aug. 1989 Division of US-Patent-Appl-SN-035401, filed 7 Apr. 1989

(NASA-CASE-MS-C-21025-2; US-PATENT-4,942,632; US-PATENT-APPL-SN-391911; US-PATENT-APPL-SN-035401; US-PATENT-CLASS-4-661; US-PATENT-CLASS-4-482; US-PATENT-CLASS-4-316; US-PATENT-CLASS-4-DIG.9; INT-PATENT-CLASS-A47K-11/00) Avail: US Patent and Trademark Office CSCL 06K

A method for collection of fecal matter designed to operate efficiently in a zero gravity environment was invented. The system consists of a waste collection area within a body having a seat opening. Low pressure within the waste collection area directs fecal matter away from the user's buttocks and prevents the escape of waste gases. The user actuates a piston covered with an absorbent pad that sweeps through the waste collection area to collect fecal matter, scrub the waste collector area, press the waste against an end of the waste collection area and retracts, leaving the used pad. Multiple pads are provided on the piston to accommodate multiple usages. Also a valve allows air to be drawn through the body, which keeps the valve from becoming plugged with the feces. A sheet feeder feeds fresh sheets of absorbent pads to a face of the piston with each actuation.

Official Gazette of the U.S. Patent and Trademark Office



N91-16566*# National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, TX.

WHOLE BODY CLEANSING AGENT Patent Application

STEVEN E. LENTSCH, inventor (to NASA) (ECO-Labs., Cleveland, OH.) 29 May 1990 15 p

(NASA-CASE-MS-C-21589-1; NAS 1.71:MSC-21589-1; US-PATENT-APPL-SN-529427) Avail: NTIS HC/MF A03 CSCL 06K

The subject invention relates to a human cleansing agent particularly suitable for use in long duration spaceflight and a method of bathing with the agent. The agent of the subject invention is in the form of a paste having a pH of 5.0 to 7.9 which comprises an acyltaurate, a skin conditioner, a hair conditioner, and a preservative. More specifically, it includes sodium N-coconut acid-N-methyl taurate, in combination with soybean lecithin, polyquaternium 16, and formalin. This particular combination satisfies the following objectives: (1) that it be usable with a minimum amount of water per shower (approximately 1 gallon); (2) that it be easily separated from the water for purposes of water reclamation; (3) that it be pH compatible with skin and hair; (4) that it rinse well in deionized water; (5) that it be mild to skin and eyes; (6) that it effectively clean both skin and hair; (7) that it be suitable for use in zero gravity; and (8) that it provide ease of combing of wet and dry hair. The method of the invention includes

the steps of wetting the skin and hair with a small quantity of water, lathering the skin with the paste, rinsing the lather from the skin and hair with a small quantity of water to produce a rinse water containing the cleansing agent, defoaming the rinse water, and supplying the defoamed rinse water to a water reclamation unit for recycling the water. The novelty of the invention appears to lie in the particular formulation of the cleansing agent and its method of use which provide optimal results under the given constraints and objectives.

NASA

60

COMPUTER OPERATIONS AND HARDWARE

Includes hardware for computer graphics, firmware, and data processing.

N91-13888*# National Aeronautics and Space Administration. Pasadena Office, CA.

AUTO AND HETERO-ASSOCIATIVE MEMORY USING A 2-D OPTICAL LOGIC GATE Patent Application

TIEN-HSIN CHAO, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 16 Feb. 1990 17 p (Contract NAS7-918)

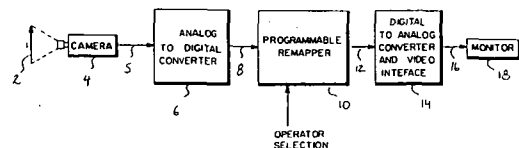
(NASA-CASE-NPO-17997-1-CU; NAS 1.71:NPO-17997-1-CU; US-PATENT-APPL-SN-481013) Avail: NTIS HC/MF A03 CSCL 09B

An optical system for auto-associative and hetero-associative recall utilizing Hamming distance as the similarity measure between a binary input image vector $V(\text{sup } k)$ and a binary image vector $V(\text{sup } m)$ in a first memory array using an optical Exclusive-OR gate for multiplication of each of a plurality of different binary image vectors in memory by the input image vector. After integrating the light of each product $V(\text{sup } k) \times V(\text{sup } m)$, a shortest Hamming distance detection electronics module determines which product has the lowest light intensity and emits a signal that activates a light emitting diode to illuminate a corresponding image vector in a second memory array for display. That corresponding image vector is identical to the memory image vector $V(\text{sup } m)$ in the first memory array for auto-associative recall or related to it, such as by name, for hetero-associative recall.

NASA

information of the input pixels being appropriately weighted. An earlier embodiment of the system included two parallel processors: a collective processor which mapped multiple input pixels into a single output pixel and an interpolative processor. The interpolative processor performed an interpolation among pixels in the input image where a given input pixel may affect the value of many output pixels. Several advantages are provided over previous embodiments in that the two distinct processors are replaced by a single processor capable of performing both types of operations (collective and interpolative) with no more complexity. Previously, there has existed no image processor or 'remapper' that can operate with sufficient speed and flexibility to permit investigating different transformation patterns in real time.

NASA



61

COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms, and specific applications, e.g., CAD/CAM.

N91-13911*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

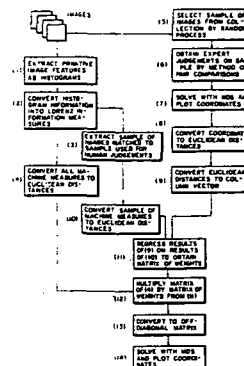
GENERAL METHOD OF PATTERN CLASSIFICATION USING THE TWO-DOMAIN THEORY Patent Application

MARK E. RORVIG, inventor (to NASA) 25 Sep. 1990 28 p

(NASA-CASE-MS-C-21737-1; NAS 1.71:MSC-21737-1; US-PATENT-APPL-SN-587922) Avail: NTIS HC/MF A03 CSCL 09B

Human beings judge patterns (such as images) by complex mental processes, some of which may not be known, while computing machines extract features. By representing the human judgements with simple measurements and reducing them and the machine extracted features to a common metric space and fitting them by regression, the judgements of human experts rendered on a sample of patterns may be imposed on a pattern population to provide automatic classification.

NASA



N91-13890*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

PROGRAMMABLE REMAPPER WITH SINGLE FLOW ARCHITECTURE Patent Application

TIMOTHY E. FISHER, inventor (to NASA) 30 Mar. 1990 24 p

(NASA-CASE-MS-C-21481-1; NAS 1.71:MSC-21481-1; US-PATENT-APPL-SN-506136) Avail: NTIS HC/MF A03

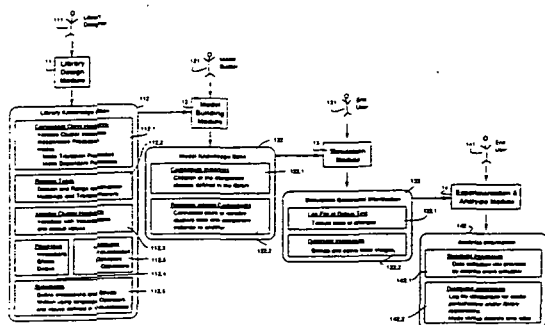
The invention relates to image processing systems and methods and in particular to a machine which accepts a real time video image in the form of a matrix of picture elements (pixels) and remaps such image according to a selectable one of a plurality of mapping functions to create an output matrix of pixels. Such mapping functions, or transformations, may be any one of a number of different transformations depending on the objective of the user of the system. The system remaps input images from one coordinate system to another using a set of look-up tables for the data necessary for the transform. The transforms, which are operator selectable, are precomputed and loaded into massive look-up tables. Input pixels, via the look-up tables of any particular transform selected, are mapped into output pixels with the radiance

N91-14741* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
DISCRETE EVENT SIMULATION TOOL FOR ANALYSIS OF QUALITATIVE MODELS OF CONTINUOUS PROCESSING SYSTEMS Patent

JANE T. MALIN, inventor (to NASA), BRYAN D. BASHAM, inventor (to NASA), and RICHARD A. HARRIS, inventor (to NASA) (Mitre Corp., McLean, VA.) 23 Oct. 1990 29 p Filed 14 Jul. 1988 (NASA-CASE-MSC-21465-1; US-PATENT-4,965,743; US-PATENT-APPL-SN-219295; US-PATENT-CLASS-364-513; US-PATENT-CLASS-364-578; INT-PATENT-CLASS-G06F-15/18) Avail: US Patent and Trademark Office CSCL 09B

An artificial intelligence design and qualitative modeling tool is disclosed for creating computer models and simulating continuous activities, functions, and/or behavior using developed discrete event techniques. Conveniently, the tool is organized in four modules: library design module, model construction module, simulation module, and experimentation and analysis. The library design module supports the building of library knowledge including component classes and elements pertinent to a particular domain of continuous activities, functions, and behavior being modeled. The continuous behavior is defined discretely with respect to invocation statements, effect statements, and time delays. The functionality of the components is defined in terms of variable cluster instances, independent processes, and modes, further defined in terms of mode transition processes and mode dependent processes. Model construction utilizes the hierarchy of libraries and connects them with appropriate relations. The simulation executes a specialized initialization routine and executes events in a manner that includes selective inherency of characteristics through a time and event schema until the event queue in the simulator is emptied. The experimentation and analysis module supports analysis through the generation of appropriate log files and graphics developments and includes the ability of log file comparisons.

Official Gazette of the U.S. Patent and Trademark Office



COMPUTER SYSTEMS

Includes computer networks and special application computer systems.

N91-14769* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

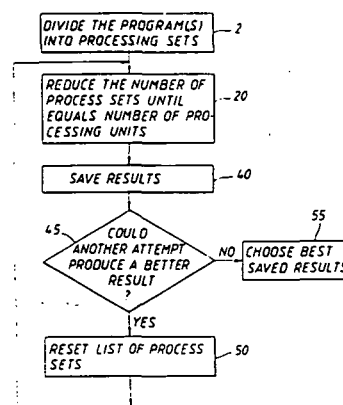
METHOD OF UP-FRONT LOAD BALANCING FOR LOCAL MEMORY PARALLEL PROCESSORS Patent

PAUL THOMAS BAFFES, inventor (to NASA) 24 Apr. 1990 10 p Filed 12 Dec. 1988 (NASA-CASE-MSC-21348-1; US-PATENT-4,920,487;

US-PATENT-APPL-SN-283106; US-PATENT-CLASS-364-300; US-PATENT-CLASS-364-228.3; US-PATENT-CLASS-364-231.9; US-PATENT-CLASS-364-280; US-PATENT-CLASS-364-281; INT-PATENT-CLASS-G06F-9/46; INT-PATENT-CLASS-G06F-15/16) Avail: US Patent and Trademark Office CSCL 09B

In a parallel processing computer system with multiple processing units and shared memory, a method is disclosed for uniformly balancing the aggregate computational load in, and utilizing minimal memory by, a network having identical computations to be executed at each connection therein. Read-only and read-write memory are subdivided into a plurality of process sets, which function like artificial processing units. Said plurality of process sets is iteratively merged and reduced to the number of processing units without exceeding the balance load. Said merger is based upon the value of a partition threshold, which is a measure of the memory utilization. The turnaround time and memory savings of the instant method are functions of the number of processing units available and the number of partitions into which the memory is subdivided. Typical results of the preferred embodiment yielded memory savings of from sixty to seventy five percent.

Official Gazette of the U.S. Patent and Trademark Office



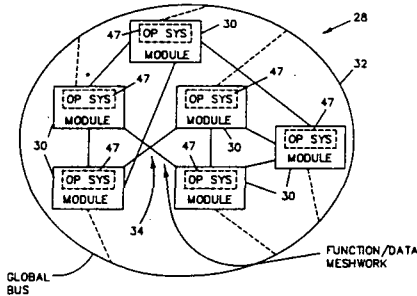
N91-14772* National Aeronautics and Space Administration. Pasadena Office, CA.

DISTRIBUTED COMPUTING SYSTEM WITH DUAL INDEPENDENT COMMUNICATIONS PATHS BETWEEN COMPUTERS AND EMPLOYING SPLIT TOKENS Patent

ROBERT D. RASMUSSEN, inventor (to NASA), ROBERT M. MANNING, inventor (to NASA), BLAIR F. LEWIS, inventor (to NASA), GARY S. BOLOTIN, inventor (to NASA), and RICHARD S. WARD, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 12 Jun. 1990 18 p Filed 17 Aug. 1987 (NASA-CASE-NPO-17185-1-CU; US-PATENT-4,933,936; US-PATENT-APPL-SN-085833; US-PATENT-CLASS-370-85.9; US-PATENT-CLASS-370-85.6; US-PATENT-CLASS-370-85.4; US-PATENT-CLASS-370-94.3; US-PATENT-CLASS-340-825.5; INT-PATENT-CLASS-H04J-3/02) Avail: US Patent and Trademark Office CSCL 09B

This is a distributed computing system providing flexible fault tolerance; ease of software design and concurrency specification; and dynamic balance of the loads. The system comprises a plurality of computers each having a first input/output interface and a second input/output interface for interfacing to communications networks each second input/output interface including a bypass for bypassing the associated computer. A global communications network interconnects the first input/output interfaces for providing each computer the ability to broadcast messages simultaneously to the remainder of the computers. A meshwork communications network interconnects the second input/output interfaces providing each computer with the ability to establish a communications link with another of the computers bypassing the remainder of a computers. Each computer is controlled by a resident copy of a

Official Gazette of the U.S. Patent and Trademark Office



63

CYBERNETICS

Includes feedback and control theory, artificial intelligence, robotics and expert systems.

N91-13944*# National Aeronautics and Space Administration.
Lyndon B. Johnson Space Center, Houston, TX.

**SYSTEM AND METHOD FOR A GENERAL PURPOSE
ARCHITECTURE FOR INTELLIGENT COMPUTER-AIDED
TRAINING Patent Application**

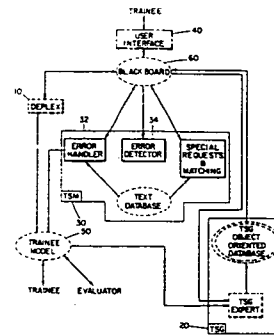
R. BOWEN LOFTIN, inventor (to NASA), LUI WANG, inventor (to NASA), PAUL BAFFES, inventor (to NASA), and GRACE C. HUA, inventor (to NASA) (Computer Sciences Corp., Houston, TX.) 28 Jun. 1990 99 p

(NASA-CASE-MS-21381-1; NAS 1.71:MSC-21381-1;
US-PATENT-APPL-SN-545235) Avail: NTIS HC/MF A05 C\$CL
09B

An intelligent computer-aided training system having a general modular architecture is provided for use in a wide variety of training tasks and environments. It is comprised of a user interface which permits the trainee to access the same information available in the task environment and serves as a means for the trainee to assert actions to the system; a domain expert which is sufficiently intelligent to use the same information available to the trainee and carry out the task assigned to the trainee; a training session manager for examining the assertions made by the domain expert and by the trainee for evaluating such trainee assertions and providing guidance to the trainee which are appropriate to his acquired skill level; a trainee model which contains a history of the trainee interactions with the system together with summary evaluative data; an intelligent training scenario generator for designing increasingly complex training exercises based on the current skill level contained in the trainee model and on any weaknesses or deficiencies that the trainee has exhibited in previous interactions; and a blackboard that provides a common fact base for communication between the other components of the system. Preferably, the domain expert contains a list of mal-rules which typifies errors that are usually made by novice trainees. Also preferably, the training session manager comprises an intelligent error detection means and an intelligent error handling means. The present invention utilizes a rule-based language having a control structure whereby a specific message passing protocol is utilized with respect to tasks which are procedural or step-by-step

in structure. The rules can be activated by the trainee in any order to reach the solution by any valid or correct path.

NASA



71

ACOUSTICS

Includes sound generation, transmission, and attenuation.

N91-14807* National Aeronautics and Space Administration.
Pasadena Office, CA.

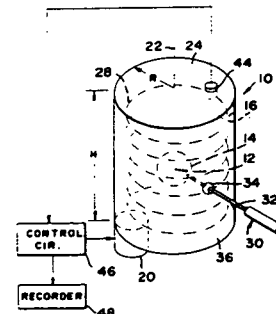
ACOUSTIC POSITIONING AND ORIENTATION PREDICTION

MARTIN B. BARMATZ, inventor (to NASA), GLENN AVENI,
inventor (to NASA), SETH PUTTERMAN, inventor (to NASA), and
JOSEPH RUDNICK, inventor (to NASA) (Jet Propulsion Lab.,
California Inst. of Tech., Pasadena.) 23 Oct. 1990 10 p Filed
15 Nov. 1988

(NASA-CASE-NPO-17511-1-CU; US-PATENT-4,964,303;
US-PATENT-APPL-SN-271265; US-PATENT-CLASS-73-505;
INT-PATENT-CLASS-G01K-15/00) Avail: US Patent and
Trademark Office CSCL 20A

A method is described for use with an acoustic positioner, which enables a determination of the equilibrium position and orientation which an object assumes in a zero gravity environment, as well as restoring forces and torques of an object in an acoustic standing wave field. An acoustic standing wave field is established in the chamber, and the object is held at several different positions near the expected equilibrium position. While the object is held at each position, the center resonant frequency of the chamber is determined, by noting which frequency results in the greatest pressure of the acoustic field. The object position which results in the lowest center resonant frequency is the equilibrium position. The orientation of a nonspherical object is similarly determined, by holding the object in a plurality of different orientations at its equilibrium position, and noting the center resonant frequency for each orientation. The orientation which results in the lowest center resonant frequency is the equilibrium orientation. Where the acoustic frequency is constant, but the chamber length is variable, the equilibrium position or orientation is that which results in the greatest chamber length at the center resonant frequency.

Official Gazette of the U.S. Patent and Trademark Office



N91-14808* National Aeronautics and Space Administration. Pasadena Office, CA.

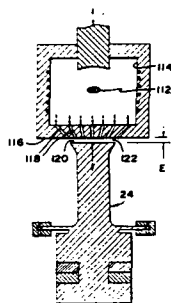
ACOUSTIC TRANSDUCER APPARATUS WITH REDUCED THERMAL CONDUCTION Patent

ERNST G. LIERKE, inventor (to NASA), EMILY W. LEUNG, inventor (to NASA), and BALAKRISHNA T. BHAT, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 9 Oct. 1990 6 p Filed 21 Mar. 1989

(NASA-CASE-NPO-17620-1-CU; US-PATENT-4,962,330; US-PATENT-APPL-SN-326756; US-PATENT-CLASS-310-323; US-PATENT-CLASS-310-325; US-PATENT-CLASS-310-334; US-PATENT-CLASS-181-0.5; INT-PATENT-CLASS-H01L-41/08) Avail: US Patent and Trademark Office CSCL 20A

A horn is described for transmitting sound from a transducer to a heated chamber containing an object which is levitated by acoustic energy while it is heated to a molten state, which minimizes heat transfer to thereby minimize heating of the transducer, minimize temperature variation in the chamber, and minimize loss of heat from the chamber. The forward portion of the horn, which is the portion closest to the chamber, has holes that reduce its cross-sectional area to minimize the conduction of heat along the length of the horn, with the entire front portion of the horn being rigid and having an even front face to efficiently transfer high frequency acoustic energy to fluid in the chamber. In one arrangement, the horn has numerous rows of holes extending perpendicular to the length of horn, with alternate rows extending perpendicular to one another to form a sinuous path for the conduction of heat along the length of the horn.

Official Gazette of the U.S. Patent and Trademark Office



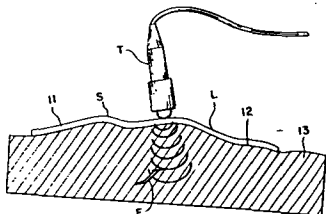
N91-16707*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

LAMINA TRANSDUCER COUPLER AND METHOD OF MAKING Patent Application

JOHN A. COMPANION, inventor (to NASA) (PRC Kentron, Inc., Hampton, VA.) 25 Sep. 1990 15 p (NASA-CASE-LAR-14361-1; NAS 1.71:LAR-14361-1; US-PATENT-APPL-SN-587920) Avail: NTIS HC/MF A03 CSCL 20A

The invention is a novel lamina transducer coupler and method of making same from a solidified layer of gel-like material. The properties and thickness of the layer determine the acoustical impedance which may also be detachably formed on a suitable substrate. This invention provides a disposable transducer coupler that detachably conforms to the surface of an object to be scanned such as a burn victim. It is essentially self-lubricating though a coating of lubricant may be applied to further reduce the friction between a scanning transducer and the coupler. Since the coupler can be preformed, sterilized and packaged for subsequent use, it is believed to have important ultrasonic medical diagnostic applications.

NASA



ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure, electron properties, and molecular spectra.

N91-14813* National Aeronautics and Space Administration. Pasadena Office, CA.

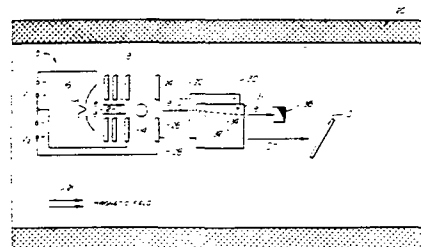
SURFACE MODIFICATION USING LOW ENERGY GROUND STATE ION BEAMS Patent

ARA CHUTJIAN, inventor (to NASA), MICHAEL H. HECHT, inventor (to NASA), and OTTO J. ORIENT, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 20 Feb. 1990 5 p Filed 21 Oct. 1988

(NASA-CASE-NPO-17498-1-CU; US-PATENT-4,902,647; US-PATENT-APPL-SN-260762; US-PATENT-CLASS-437-239; US-PATENT-CLASS-437-225; US-PATENT-CLASS-437-228; US-PATENT-CLASS-437-930; US-PATENT-CLASS-437-936; US-PATENT-CLASS-437-235; US-PATENT-CLASS-437-238) Avail: US Patent and Trademark Office CSCL 20H

A method of effecting modifications at the surfaces of materials using low energy ion beams of known quantum state, purity, flux, and energy is presented. The ion beam is obtained by bombarding ion-generating molecules with electrons which are also at low energy. The electrons used to bombard the ion generating molecules are separated from the ions thus obtained and the ion beam is directed at the material surface to be modified. Depending on the type of ion generating molecules used, different ions can be obtained for different types of surface modifications such as oxidation and diamond film formation. One area of application is in the manufacture of semiconductor devices from semiconductor wafers.

Official Gazette of the U.S. Patent and Trademark Office



OPTICS

Includes light phenomena; and optical devices.

N91-13995*# National Aeronautics and Space Administration. Pasadena Office, CA.

HIGH-GAIN ALGAS/GAAS DOUBLE HETEROJUNCTION DARLINGTON PHOTOTRANSISTORS FOR OPTICAL NEURAL NETWORKS Patent Application

JAE H. KIM, inventor (to NASA) and STEVEN H. LIN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 11 Oct. 1990 20 p (Contract NAS7-918)

(NASA-CASE-NPO-18101-1-CU; NAS 1.71:NPO-18101-1-CU; US-PATENT-APPL-SN-596133) Avail: NTIS HC/MF A03 CSCL 20F

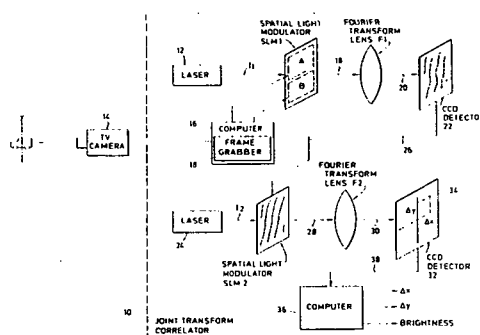
High-gain MOCVD-grown (metal-organic chemical vapor deposition) AlGaAs/GaAs/AlGaAs n-p-n double heterojunction

bipolar transistors (DHBTs) and Darlington phototransistor pairs are provided for use in optical neural networks and other optoelectronic integrated circuit applications. The reduced base doping level used herein results in effective blockage of Zn out-diffusion, enabling a current gain of 500, higher than most previously reported values for Zn-diffused-base DHBTs. Darlington phototransistor pairs of this material can achieve a current gain of over 6,000, which satisfies the gain requirement for optical neural network designs, which advantageously may employ neurons comprising the Darlington phototransistor pair in series with a light source.

NASA

eye surgical apparatus where an image of the fundus of an eyeball is stabilized and forms the basis for the correlator apparatus to track the position of the eyeball caused by involuntary movement. With knowledge of the eyeball position, a surgical laser can be precisely pointed toward a position on the retina.

NASA



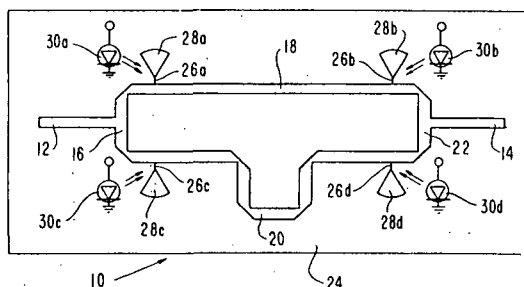
N91-13996*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

MONOLITHIC MM-WAVE PHASE SHIFTER USING OPTICALLY ACTIVATED SUPERCONDUCTING SWITCHES Patent Application

ROBERT R. ROMANOFSKY, inventor (to NASA) and KUL B. BHASIN, inventor (to NASA) 25 Sep. 1990 16 p (NASA-CASE-LEW-14878-1; NAS 1.71:LEW-14878-1; US-PATENT-APPL-SN-587921) Avail: NTIS HC/MF A03 CSCL 20F

A phase shifter is disclosed having a reference path and a delay path, light sources, and superconductive switches. Each of the superconductive switches is terminated in a virtual short circuit, which may be a radial stub. Switching between the reference path and delayed path is accomplished by illuminating the superconductive switches connected to the desired path, while not illuminating the superconductive switches connected to the other path.

NASA



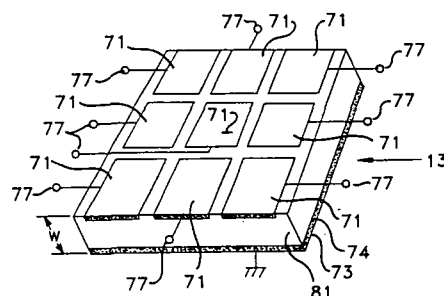
N91-13998*# National Aeronautics and Space Administration. Pasadena Office, CA.

MOTION DETECTION, NOVELTY FILTERING, AND TARGET TRACKING USING AN INTERFEROMETRIC TECHNIQUE WITH A GAAS PHASE CONJUGATE MIRROR Patent Application

LI-JEN CHENG, inventor (to NASA) and TSUEN-HSI LIU, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 16 Aug. 1990 17 p (Contract NAS7-918) (NASA-CASE-NPO-17784-1-CU; NAS 1.71:NPO-17784-1-CU; US-PATENT-APPL-SN-568129) Avail: NTIS HC/MF A03 CSCL 20F

A method and apparatus is disclosed for detecting and tracking moving objects in a noise environment cluttered with fast-and slow-moving objects and other time-varying background. A pair of phase conjugate light beams carrying the same spatial information commonly cancel each other out through an image subtraction process in a phase conjugate interferometer, wherein gratings are formed in a fast photo-refractive phase conjugate mirror material. In the steady state, there is no output. When the optical path of one of the two phase conjugate beams is suddenly changed, the return beam loses its phase conjugate nature and the interferometer is out of balance, resulting in an observable output. The observable output lasts until the phase conjugate nature of the beam has recovered. The observable time of the output signal is roughly equal to the formation time of the grating. If the optical path changing time is slower than the formation time, the change of optical path becomes unobservable, because the index grating can follow the change. Thus, objects traveling at speeds which result in a path changing time which is slower than the formation time are not observable and do not clutter the output image view.

NASA



N91-13997*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

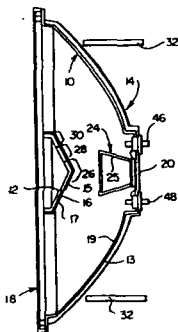
OPTICAL JOINT CORRELATION FOR REAL-TIME TRACKING Patent Application

RICHARD D. JUDAY, inventor (to NASA) 31 Jul. 1990 18 p (NASA-CASE-MSC-21509-1; NAS 1.71:MSC-21509-1; US-PATENT-APPL-SN-560924) Avail: NTIS HC/MF A03 CSCL 20F

A method for tracking an object in a sequence of images is described. Such sequence of images may, for example, be a sequence of television frames. The object in the current frame is correlated with the object in the previous frame to obtain the relative location of the object in the two frames. An optical joint transform correlator apparatus is provided to carry out the process. Such joint transform correlator apparatus forms the basis for laser

N91-13999*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
WIDE ACCEPTANCE ANGLE, HIGH CONCENTRATION RATIO, OPTICAL COLLECTOR Patent Application
 MARK ARTHUR KRUEER, inventor (to NASA) (TRW Defense and Space Systems Group, Redondo Beach, CA.) 30 Mar. 1990 15 p
 (NASA-CASE-MFS-28295-1; NAS 1.71:MFS-28295-1; US-PATENT-APPL-SN-503408) Avail: NTIS HC/MF A03 CSCL 20F

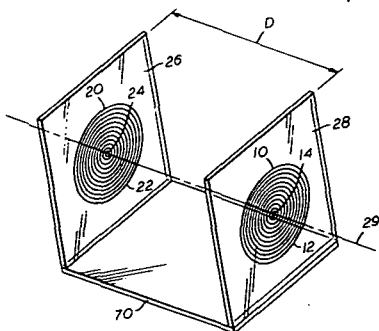
The invention is directed to an optical collector requiring a wide acceptance angle, and a high concentration ratio. The invention is particularly adapted for use in solar collectors of cassegrain design. The optical collector system includes a parabolic circular concave primary mirror and a hyperbolic circular convex secondary mirror. The primary mirror includes a circular hole located at its center wherein a solar collector is located. The mirrored surface of the secondary mirror has three distinct zones: a center circle, an on-axis annulus, and an off-axis section. The parabolic shape of the primary mirror is chosen so that the primary mirror reflects light entering the system on-axis onto the on-axis annulus. A substantial amount of light entering the system off-axis is reflected by the primary mirror onto either the off-axis section or onto the center circle. Subsequently, the off-axis sections reflect the off-axis light toward the solar collector. Thus, off-axis light is captured which would otherwise be lost to the system. The novelty of the system appears to lie in the configuration of the primary mirror which focuses off-axis light onto an annular portion of the secondary mirror to enable capture thereof. This feature results in wide acceptance angle and a high concentration ratio, and also compensates for the effects of non-specular reflection, and enables a cassegrain configuration to be used where such characteristics are required.



NASA

N91-14000*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
THREE DIMENSIONAL MOIRE PATTERN ALIGNMENT Patent Application
 RICHARD D. JUDAY, inventor (to NASA) 28 Jun. 1990 24 p
 (NASA-CASE-MSC-21416-1; NAS 1.71:MSC-21416-1; US-PATENT-APPL-SN-545177) Avail: NTIS HC/MF A03

An apparatus is disclosed for determining three dimensional positioning relative to a predetermined point utilizing moire interference patterns such that the patterns are complementary when viewed on axis from the predetermined distance. Further, the invention includes means for determining rotational positioning in addition to three dimensional translational positioning.

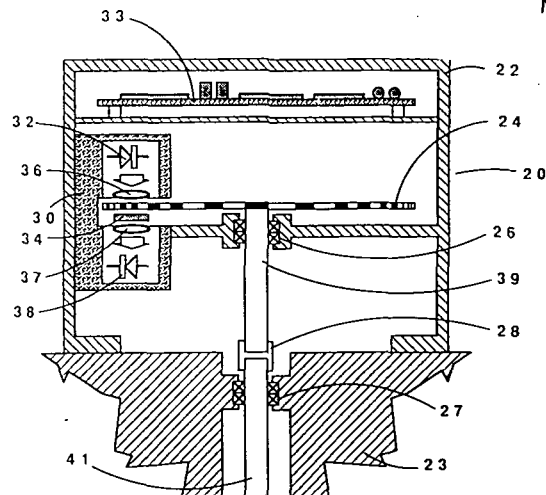


NASA

N91-14001*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
LASER OPTICAL DISK POSITION ENCODER WITH ACTIVE HEADS Patent Application
 ERIC P. OSBORNE, inventor (to NASA) 30 Mar. 1990 57 p
 (NASA-CASE-GSC-13175-1; NAS 1.71:GSC-13175-1; US-PATENT-APPL-SN-506636) Avail: NTIS HC/MF A04 CSCL 20F

An angular position encoder is provided that minimizes the effects of eccentricity and other misalignments between the disk and the read stations by employing heads which incorporate beam steering optics with the ability to actively track the disk in directions along the disk radius and normal to its surface. The device adapts features prevalent in optical disk technology toward the application of angular position sensing. A reflective disk and the principles of interferometry are employed. The servo-controlled steering optics move so as to acquire a track on the disk lying at a predetermined radius and distance below the head, and then adjust position and orientation in order to maintain the view of the disk track as required. Thus, the device is actively self-aligning.

NASA



N91-14002*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
APPARATUS FOR PRECISION FOCUSING AND POSITIONING OF A BEAM WAIST ON A TARGET Patent Application
 DANA H. LYNCH, inventor (to NASA), WILLIAM D. GUNTER, inventor (to NASA), and KENNETH W. MCALISTER, inventor (to NASA) (Army Research and Technology Labs., Moffett Field, CA.) 31 May 1990 29 p
 (NASA-CASE-ARC-11916-1-SB; NAS 1.71:ARC-11916-1-SB; US-PATENT-APPL-SN-531373) Avail: NTIS HC/MF A03

The invention relates to optical focussing apparatus and, more particularly, to optical apparatus for focussing a highly collimated Gaussian beam which provides independent and fine control over the focus waist diameter, the focus position both along the beam axis and transverse to the beam, and the focus angle. A beam focusing and positioning apparatus provides focusing and positioning for the waist of a waisted beam at a desired location on a target such as an optical fiber. The apparatus includes a first lens, having a focal plane $f(\text{sub } 1)$, disposed in the path of an incoming beam and a second lens, having a focal plane $f(\text{sub } 2)$ and being space downstream from the first lens by a distance at least equal to $f(\text{sub } 1) + 10 f(\text{sub } 2)$, which cooperates with the first lens to focus the waist of the beam on the target. A rotatable optical device, disposed upstream of the first lens, adjusts the angular orientation of the beam waist. The transverse position of the first lens relative to the axis of the beam is varied to control the transverse position of the beam waist relative to the target (a fiber optic as shown) while the relative axial positions of the lenses are varied to control the diameter of the beam waist and to control the axial position of the beam waist. Mechanical controllers $C(\text{sub } 1)$, $C(\text{sub } 2)$, $C(\text{sub } 3)$, $C(\text{sub } 4)$, and $C(\text{sub } 5)$

control the elements of the optical system. How seven adjustments can be made to correctly couple a laser beam into an optical fiber is illustrated. Prior art systems employing optical techniques to couple a laser beam into an optical fiber or other target simply do not provide the seven necessary adjustments. The closest known prior art, a Newport coupler, provides only two of the seven required adjustments.

NASA

N91-14835* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

X RAY SENSITIVE AREA DETECTION DEVICE Patent

DANIEL C. CARTER, inventor (to NASA), WILLIAM K. WITHEROW, inventor (to NASA), MARC L. PUSEY, inventor (to NASA), and VAUGHN H. YOST, inventor (to NASA) 12 Jun. 1990 14 p Filed 31 Jan. 1989

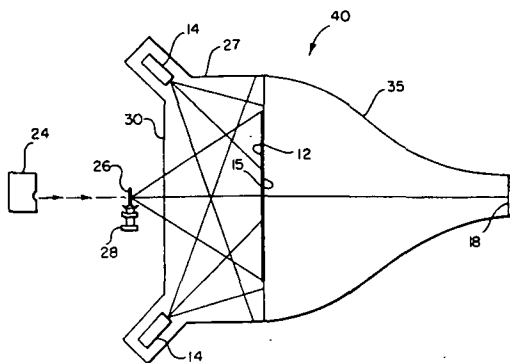
(NASA-CASE-MFS-28232-1; US-PATENT-4,933,558; US-PATENT-APPL-SN-304155; US-PATENT-CLASS-250-327.2; US-PATENT-CLASS-250-484.1;

INT-PATENT-CLASS-G01N-23/20;

INT-PATENT-CLASS-H05B-33/00) Avail: US Patent and Trademark Office CSCL 20F

A radiation sensitive area detection device is disclosed which comprises a phosphor-containing film capable of receiving and storing an image formed by a pattern of incoming x rays, UV, or other radiation falling on the film. The device is capable of fluorescing in response to stimulation by a light source in a manner directly proportional to the stored radiation pattern. The device includes: (1) a light source capable of projecting light or other appropriate electromagnetic wave on the film so as to cause it to fluoresce; (2) a means to focus the fluoresced light coming from the phosphor-containing film after light stimulation; and (3) at least one charged coupled detector or other detecting element capable of receiving and digitizing the pattern of fluoresced light coming from the phosphor-containing film. The device will be able to generate superior x ray images of high resolution from a crystal or other sample and will be particularly advantageous in that instantaneous near-real-time images of rapidly deteriorating samples can be obtained. Furthermore, the device can be made compact and sturdy, thus capable of carrying out x ray or other radiation imaging under a variety of conditions, including those experienced in space.

Official Gazette of the U.S. Patent and Trademark Office



N91-15874*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

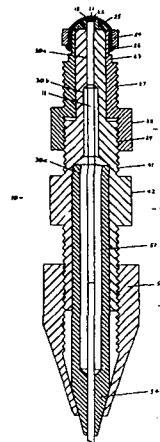
FIBER OPTIC MICROPHONE Patent Application

ALLAN J. ZUCKERWAR, inventor (to NASA), FRANK W. CUOMO,

inventor (to NASA) (Rhode Island Univ., Kingston.), WILLIAM E. ROBBINS, inventor (to NASA), and PURNELL HOPSON, JR., inventor (to NASA) 21 Sep. 1990 35 p (NASA-CASE-LAR-14402-1-CU; NAS 1.71:LAR-14402-1-CU; US-PATENT-APPL-SN-586369) Avail: NTIS HC/MF A03 CSCL 20F

A fiber optic microphone is provided for measuring fluctuating pressures. An optical fiber probe having at least one transmitting fiber for transmitting light to a pressure-sensing membrane and at least one receiving fiber for receiving light reflected from a stretched membrane is provided. The pressure-sensing membrane may be stretched for high frequency response. Further, a reflecting surface of the pressure-sensing membrane may have dimensions which substantially correspond to dimensions of a cross section of the optical fiber probe. Further, the fiber optic microphone can be made of materials for use in high temperature environments, for example greater than 1000 F. A fiber optic probe is also provided with a backplate for damping membrane motion. The backplate further provides a means for on-line calibration of the microphone.

NASA



76

SOLID-STATE PHYSICS

Includes superconductivity.

N91-14066*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

METHOD OF FABRICATING GERMANIUM AND GALLIUM ARSENIDE DEVICES Patent Application

MURZBAN JHABVALA, inventor (to NASA) 31 Aug. 1990 10 p

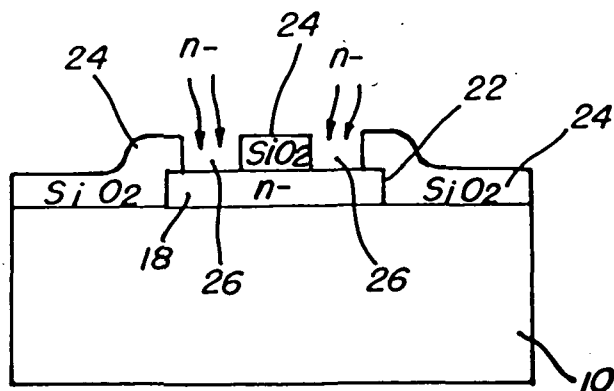
(NASA-CASE-GSC-13265-1; NAS 1.71:GSC-13265-1;

US-PATENT-APPL-SN-575694) Avail: NTIS HC/MF A02

A method of semiconductor diode fabrication is disclosed which relies on the epitaxial growth of a precisely doped thickness layer of gallium arsenide or germanium on a semi-insulating or intrinsic substrate, respectively, of gallium arsenide or germanium by either molecular beam epitaxy (MBE) or by metal-organic chemical vapor deposition (MOCVD). The method involves: depositing a layer of doped or undoped silicon dioxide on a germanium or gallium arsenide wafer or substrate, selectively removing the silicon dioxide layer to define one or more surface regions for a device to be fabricated thereon, growing a matched epitaxial layer of doped germanium or gallium arsenide of an appropriate thickness using MBE or MOCVD techniques on both the silicon dioxide layer and the defined one or more regions; and etching the silicon dioxide and the epitaxial material on top of the silicon dioxide to leave a matched epitaxial layer of germanium or gallium arsenide on the

germanium or gallium arsenide substrate, respectively, and upon which a field effect device can thereafter be formed.

NASA



N91-14872* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

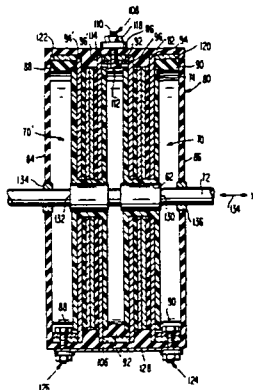
PIEZOELECTROSTATIC GENERATOR Patent

GLEN A. ROBERTSON, inventor (to NASA) 28 Aug. 1990 10 p Filed 27 Apr. 1989

(NASA-CASE-MFS-28298-1; US-PATENT-4,952,836; US-PATENT-APPL-SN-343656; US-PATENT-CLASS-310-339; US-PATENT-CLASS-310-330; US-PATENT-CLASS-310-331; US-PATENT-CLASS-310-340; INT-PATENT-CLASS-H01L-41/08) Avail: US Patent and Trademark Office CSCL 20L

A piezoelectrostatic generator includes a plurality of elongated piezoelectric elements having first and second ends, with the first ends fixedly mounted in a cylindrical housing and the second extending radially inwardly toward an axis. A shaft movable along the axis is connected to the inner ends of the elements to produce bending forces in piezoelectric strips within the elements. Each element includes a pair of strips mounted in surface contact and in electrical series to produce a potential upon bending. Electrodes spaced from the strips by a solid dielectric material act as capacitor plates to collect the potential charge.

Official Gazette of the U.S. Patent and Trademark Office



N91-15898* National Aeronautics and Space Administration. Pasadena Office, CA.

RIBBON GROWING METHOD AND APPARATUS Patent

ANDREW D. MORRISON, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 29 Aug. 1989 6 p Filed

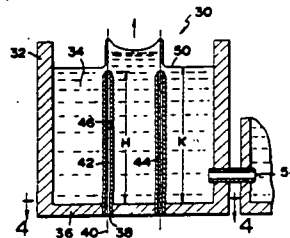
4 Apr. 1985

(NASA-CASE-NPO-16306-1-CU; US-PATENT-4,861,416; US-PATENT-APPL-SN-718798; US-PATENT-CLASS-156-608; US-PATENT-CLASS-156-617.1; US-PATENT-CLASS-156-620.1; US-PATENT-CLASS-118-405; US-PATENT-CLASS-118-407; US-PATENT-CLASS-118-419; US-PATENT-CLASS-118-428)

Avail: US Patent and Trademark Office CSCL 20L

A method and apparatus are described which facilitate the growing of silicon ribbon. A container for molten silicon has a pair of passages in its bottom through which filaments extend to a level above the molten silicon, so as the filaments are pulled up they drag up molten silicon to form a ribbon. A pair of guides surround the filaments along most of the height of the molten silicon, so that the filament contacts only the upper portion of the melt. This permits a filament to be used which tends to contaminate the melt if it is in long term contact with the melt. This arrangement also enables a higher melt to be used without danger that the molten silicon will run out of any bottom hole.

Official Gazette of the U.S. Patent and Trademark Office



N91-16815*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

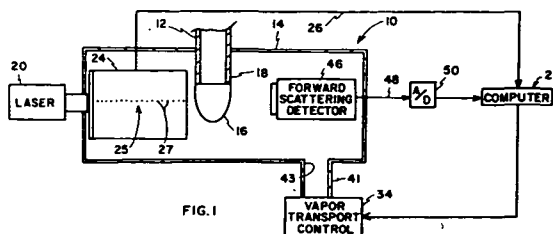
HANGING DROP CRYSTAL GROWTH APPARATUS Patent Application

ROBERT J. NAUMANN, inventor (to NASA), WILLIAM K. WITHEROW, inventor (to NASA), DANIEL C. CARTER, inventor (to NASA), CHARLES E. BUGG, inventor (to NASA), and FRED L. SUDDATH, inventor (to NASA) (Alabama Univ., Birmingham.) 31 Aug. 1990 18 p

(NASA-CASE-MFS-26061-1; NAS 1.71:MFS-26061-1; US-PATENT-APPL-SN-575708) Avail: NTIS HC/MF A03 CSCL 20L

This invention relates generally to control systems for controlling crystal growth, and more particularly to such a system which uses a beam of light refracted by the fluid in which crystals are growing to detect concentration of solutes in the liquid. In a hanging drop apparatus, a laser beam is directed onto drop which refracts the laser light into primary and secondary bows, respectively, which in turn fall upon linear diode detector arrays. As concentration of solutes in drop increases due to solvent removal, these bows move farther apart on the arrays, with the relative separation being detected by arrays and used by a computer to adjust solvent vapor transport from the drop. A forward scattering detector is used to detect crystal nucleation in drop, and a humidity detector is used, in one embodiment, to detect relative humidity in the enclosure wherein drop is suspended. The novelty of this invention lies in utilizing angular variance of light refracted from drop to infer, by a computer algorithm, concentration of solutes therein. Additional novelty is believed to lie in using a forward scattering detector to detect nucleating crystallites in drop.

NASA



ASTRONOMY

Includes radio, gamma-ray, and infrared astronomy; and astrometry.

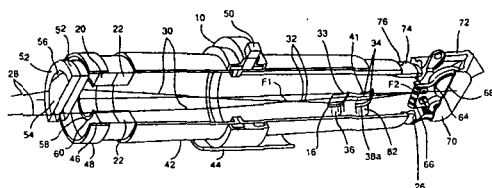
N91-14096*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

VARIABLE MAGNIFICATION GLANCING INCIDENCE X RAY TELESCOPE Patent Application

RICHARD HOOVER, inventor (to NASA) 28 Jun. 1990 22 p (NASA-CASE-MFS-28013-2; NAS 1.71:MFS-28013-2; US-PATENT-APPL-SN-545220) Avail: NTIS HC/MF A03

A multispectral glancing incidence x ray telescope is disclosed, which capable of broadband, high resolution imaging of solar and stellar x ray and extreme ultraviolet radiation sources includes a primary optical system which focuses the incoming radiation to a primary focus. Two or more ellipsoidal mirrors are positioned behind the primary focus at an inclination to the optical axis, each mirror having a concave surface coated with a multilayer synthetic microstructure coating to reflect a desired wavelength. The ellipsoidal mirrors are segments of respective ellipsoids having a common first focus coincident with the primary focus. A detector such as an x ray sensitive photographic film is positioned at the second focus of each of the ellipsoids so that each of the ellipsoidal mirrors may reflect the image at the first focus to the detector. In one embodiment the mirrors are inclined at different angles and has its respective second focus at a different location, separate detectors being located at the respective second focus. The mirrors are arranged so that the magnification and field of view differ, and a solenoid activated arm may withdraw at least one mirror from the beam to select the mirror upon which the beam is to impinge so that selected magnifications and fields of view may be detected.

NASA



PUBLIC AVAILABILITY OF COPIES OF PATENTS AND PATENT APPLICATIONS

Copies of U.S. patents may be purchased directly from the U.S. Patent and Trademark Office, Washington, D.C. 20231 at \$1.50 per copy. When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office.

NASA *patent application specifications* are sold in paper copy and microfiche by the National Technical Information Service. The US-Patent-Appl-SN-number should be used in ordering either paper copy or microfiche from NTIS.

LICENSES FOR COMMERCIAL USE: INQUIRIES AND APPLICATIONS FOR LICENSE

NASA inventions, abstracted in *NASA PAB*, are available for nonexclusive or exclusive licensing in accordance with the NASA Patent Licensing Regulations. It is significant that all licenses for NASA inventions shall be by express written instruments and that no license will be granted or implied in a NASA invention except as provided in the NASA Patent Licensing Regulations.

Inquiries concerning the NASA Patent Licensing Program or the availability of licenses for the commercial use of NASA-owned inventions covered by U.S. patents or pending applications for patent should be forwarded to the NASA Patent Counsel of the NASA installation having cognizance of the specific invention, or the Associate General Counsel for Intellectual Property, code GP, National Aeronautics and Space Administration, Washington, D.C. 20546. Inquiries should refer to the NASA Case Number, the Title of the Invention, and the U.S. Patent Number or the U.S. Application Serial Number assigned to the invention as shown in *NASA PAB*.

The NASA Patent Counsel having cognizance of the invention is determined by the first three letters or prefix of the NASA Case Number assigned to the invention. The addresses of NASA Patent Counsels are listed alongside the NASA Case Number prefix letters in the following table.

STANDING ORDER SUBSCRIPTIONS

NASA SP-7039, Section 1 and its supplements are available from the National Technical Information Service (NTIS) on standing order subscription as PB 91-911100 at the price of \$15.00 domestic and \$30.00 foreign. Standing order subscriptions do not terminate at the end of a year, as do regular subscriptions, but continue indefinitely unless specifically terminated by the subscriber.

**NASA Case
Number
Prefix Letters**

**Address of Cognizant
NASA Patent Counsel**

ARC-xxxxx
XAR-xxxxx

Ames Research Center
Mail Code: 200-11A
Moffett Field, California 94035
Telephone: (415) 694-5104

ERC-xxxxx
XER-xxxxx
HQN-xxxxx
XHQ-xxxxx

NASA Headquarters
Mail Code: GP
Washington, D.C. 20546
Telephone: (202) 453-2417

GSC-xxxxx
XGS-xxxxx

Goddard Space Flight Center
Mail Code: 204
Greenbelt, Maryland 20771
Telephone: (301) 286-7351

KSC-xxxxx
XKS-xxxxx

John F. Kennedy Space Center
Mail Code: PT-PAT
Kennedy Space Center, Florida 32899
Telephone: (305) 867-2544

LAR-xxxxx
XLA-xxxxx

Langley Research Center
Mail Code: 279
Hampton, Virginia 23365
Telephone: (804) 865-3725

LEW-xxxxx
XLE-xxxxx

Lewis Research Center
Mail Code: 500-318
21000 Brookpark Road
Cleveland, Ohio 44135
Telephone: (216) 433-5753

MSC-xxxxx
XMS-xxxxx

Lyndon B. Johnson Space Center
Mail Code: AL3
Houston, Texas 77058
Telephone: (713) 483-4871

MFS-xxxxx
XMF-xxxxx

George C. Marshall Space Flight Center
Mail Code: CC01
Huntsville, Alabama 35812
Telephone: (205) 544-0024

NPO-xxxxx
XNP-xxxxx
FRC-xxxxx
XFR-xxxxx
WOO-xxxxx

NASA Resident Legal Office
Mail Code: 180-801
4800 Oak Grove Drive
Pasadena, California 91103
Telephone: (818) 354-2700

PATENT LICENSING REGULATIONS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

14 CFR Part 1245

Licensing of NASA Inventions

AGENCY: National Aeronautics and Space Administration

ACTION: Interim regulation with comments requested.

SUMMARY: The National Aeronautics and Space Administration (NASA) is revising its patent licensing regulations to conform with Pub. L. 96-517. This interim regulation provides policies and procedures applicable to the licensing of federally owned inventions in the custody of the National Aeronautics and Space Administration, and implements Pub. L. 96-517. The object of this subpart is to use the patent system to promote the utilization of inventions arising from NASA supported research and development.

EFFECTIVE DATE: July 1, 1981. Comments must be received in writing by December 2, 1981. Unless a notice is published in the **Federal Register** after the comment period indicating changes to be made, this interim regulation shall become a final regulation.

ADDRESS: Mr. John G. Mannix, Director of Patent Licensing, GP-4, NASA, Washington, D.C. 20546

FOR FURTHER INFORMATION CONTACT:

Mr. John G. Mannix, (202) 755-3954.

SUPPLEMENTARY INFORMATION:

PART 1245—PATENTS AND OTHER INTELLECTUAL PROPERTY RIGHTS

Subpart 2 of Part 1245 is revised to read as follows:

Subpart 2—Licensing of NASA Inventions

Sec.

1245.200 Scope of subpart.

1245.201 Policy and objective.

1245.202 Definitions.

1245.203 Authority to grant licenses.

Restrictions and Conditions

1245.204 All licenses granted under this subpart.

Types of Licenses

1245.205 Nonexclusive licenses.

1245.206 Exclusive and partially exclusive licenses.

Procedures

1245.207 Application for a license.

1245.208 Processing applications.

1245.209 Notice to Attorney General.

1245.210 Modification and termination of licenses.

1245.211 Appeals.

1245.212 Protection and administration of inventions.

1245.213 Transfer of custody.

1245.214 Confidentiality of information.

Authority: 35 U.S.C. Section 207 and 208.94 Stat 3023 and 3024.

Subpart 2—Licensing of NASA Inventions

§ 1245.200 Scope of subpart.

This subpart prescribes the terms, conditions and procedures upon which a NASA invention may be licensed. It does not affect licenses which (a) were in effect prior to July 1, 1981; (b) may exist at the time of the Government's acquisition of title to the invention, including those resulting from the allocation of rights to inventions made under Government research and development contracts; (c) are the result of an authorized exchange of rights in the settlement of patent disputes; or (d) are otherwise authorized by law or treaty.

§ 1245.201 Policy and objective.

It is the policy and objective of this subpart to use the patent system to promote the utilization of inventions arising from NASA supported research and development.

§ 1245.202 Definitions

(a) "Federally owned invention" means an invention, plant, or design which is covered by a patent, or patent application in the United States, or a patent, patent application, plant variety protection, or other form of protection, in a foreign country, title to which has been assigned to or otherwise vested in the United States Government.

(b) "Federal agency" means an executive department, military department, Government corporation, or independent establishment, except the Tennessee Valley Authority, which has custody of a Federally owned invention.

(c) "NASA Invention" means a Federally owned invention with respect to which NASA maintains custody and administration, in whole or in part, of the right, title or interest in such invention on behalf of the United States Government.

(d) "Small business firm" means a small business concern as defined at section 2 of Pub. L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration. For the purpose of these regulations, the size standard for small business concerns involved in Government procurement, contained in 13 CFR 121.3-8, and in subcontracting, contained in 13 CFR 121.3-12, will be used.

(e) "Practical application" means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such condition, as to establish that the invention is being utilized and that its benefits are to the extent permitted by law or Government regulations available to the public on reasonable terms.

(f) "United States" means the United States of America, its territories and possessions, the District of Columbia, and the Commonwealth of Puerto Rico.

§ 1245.203 Authority to grant licenses.

NASA inventions shall be made available for licensing as deemed appropriate in the public interest. NASA may grant nonexclusive, partially exclusive, or exclusive licenses thereto under this subpart on inventions in its custody.

Restrictions and Conditions

§ 1245.204 All licenses granted under this subpart.

(a) **Restrictions.** (1) A license may be granted only if the applicant has supplied NASA with a satisfactory plan for development or marketing of the invention, or both, and with information about the applicant's capability to fulfill the plan.

(2) A license granting rights to use or sell under a NASA invention in the United States shall normally be granted only to a licensee who agrees that any products embodying the invention or produced through the use of the invention will be manufactured substantially in the United States.

(b) **Conditions.** Licenses shall contain such terms and conditions as NASA determines are appropriate for the protection of the interests of the Federal Government and the public and are not in conflict with law or this subpart. The following terms and conditions apply to any license:

(1) The duration of the license shall be for a period specified in the license agreement, unless sooner terminated in accordance with this subpart.

(2) The license may be granted for all or less than all fields of use of the invention or in specified geographical areas, or both.

(3) The license may extend to subsidiaries of the licensee or other parties if provided for in the license but shall be nonassignable without approval of NASA, except to the successor of that part of the licensee's business to which the invention pertains.

(4) The license may provide the licensee the right to grant sublicenses under the license, subject to the approval of NASA. Each sublicense shall make reference to the license, including the rights retained by the Government, and a copy of such sublicense shall be furnished to NASA.

(5) The license shall require the licensee to carry out the plan for development or marketing of the invention, or both, to bring the invention to practical application within a period specified in the license, and to continue to make the benefits of the invention reasonably accessible to the public.

PATENT LICENSING REGULATIONS

(6) The license shall require the licensee to report periodically on the utilization or efforts at obtaining utilization that are being made by the licensee, with particular reference to the plan submitted.

(7) All licenses shall normally require royalties or other consideration.

(8) Where an agreement is obtained pursuant to § 1245.204(a)(2) that any products embodying the invention or produced through use of the invention will be manufactured substantially in the United States, the license shall recite such agreement.

(9) The license shall provide for the right of NASA to terminate the license, in whole or in part, if:

(i) NASA determines that the licensee is not executing the plan submitted with its request for a license and the licensee cannot otherwise demonstrate to the satisfaction of NASA that it has taken or can be expected to take within a reasonable time effective steps to achieve practical application of the invention;

(ii) NASA determines that such action is necessary to meet requirements for public use specified by Federal regulations issued after the date of the license and such requirements are not reasonably satisfied by the licensee;

(iii) The licensee has willfully made a false statement of or willfully omitted a material fact in the license application or in any report required by the license agreement; or

(iv) The licensee commits a substantial breach of a covenant or agreement contained in the license.

(10) The license may be modified or terminated, consistent with this subpart, upon mutual agreement of NASA and the licensee.

(11) Nothing relating to the grant of a license, nor the grant itself, shall be construed to confer upon any person any immunity from or defenses under the antitrust laws or from a charge of patent misuse, and the acquisition and use of rights pursuant to this subpart shall not be immunized from the operation of state or Federal law by reason of the source of the grant.

Types of Licenses

§ 1245.205 Nonexclusive licenses.

(a) *Availability of licenses.* Nonexclusive licenses may be granted under NASA inventions without publication of availability or notice of a prospective license.

(b) *Conditions.* In addition to the provisions of § 1245.204, the nonexclusive license may also provide that, after termination of a period specified in the license agreement, NASA may restrict the license to the fields of use or geographic areas, or both, in which the licensee has brought the invention to practical application and continues to make the benefits of the invention reasonably accessible to the public. However, such restriction shall be made only in order to grant an exclusive or partially exclusive license in accordance with this subpart.

§ 1245.206 Exclusive and partially exclusive licenses.

(a) Domestic licenses.

(1) *Availability of licenses.* Exclusive or partially exclusive licenses may be granted on NASA inventions: (i) 3 months after notice of the invention's availability has been announced in the **Federal Register**; or (ii) without such notice where NASA determines that expeditious granting of such a license will best serve the interests of the Federal Government and the public; and (iii) in either situation, specified in (a)(1)(i) or (ii) of this section only if:

(A) Notice of a prospective license, identifying the invention and the prospective licensee, has been published in the **Federal Register**, providing opportunity for filing written objections within a 60-day period;

(B) After expiration of the period in § 1245.206(a)(1)(iii)(A) and consideration of any written objections received during the period, NASA has determined that:

(1) The interests of the Federal Government and the public will best be served by the proposed license, in view of the applicant's intentions, plans, and ability to bring the invention to practical application or otherwise promote the invention's utilization by the public;

(2) The desired practical application has not been achieved, or is not likely expeditiously to be achieved, under any nonexclusive license which has been granted, or which may be granted, on the invention;

(3) Exclusive or partially exclusive licensing is a reasonable and necessary incentive to call forth the investment of risk capital and expenditures to bring the invention to practical application or otherwise promote the invention's utilization by the public; and

(4) The proposed terms and scope of exclusivity are not greater than reasonably necessary to provide the incentive for bringing the invention to practical application or otherwise promote the invention's utilization by the public;

(C) NASA has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the country in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with the antitrust laws; and

(D) NASA has given first preference to any small business firms submitting plans that are determined by the agency to be within the capabilities of the firms and as equally likely, if executed, to bring the invention to practical application as any plans submitted by applicants that are not small business firms.

(2) *Conditions.* In addition to the provisions of § 1245.204, the following terms and conditions apply to domestic exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall reserve to NASA the right to require the licensee to grant sublicenses to responsible applicants, on reasonable terms, when necessary to fulfill health or safety needs.

(iii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iv) The license may grant the licensee the right of enforcement of the licensed patent pursuant to the provisions of Chapter 29 of Title 35, United States Code, or other statutes, as determined appropriate in the public interest.

(b) Foreign licenses.

(1) *Availability of licenses.* Exclusive or partially exclusive licenses may be granted on a NASA invention covered by a foreign patent, patent application, or other form of protection, provided that:

(i) Notice of a prospective license, identifying the invention and prospective licensee, has been published in the **Federal Register**, providing opportunity for filing written objections within a 60-day period and following consideration of such objections;

(ii) NASA has considered whether the interests of the Federal Government or United States industry in foreign commerce will be enhanced; and

(iii) NASA has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the United States in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with antitrust laws.

(2) *Conditions.* In addition to the provisions of § 1245.204, the following terms and conditions apply to foreign exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iii) The license may grant the licensee the right to take any suitable and necessary actions to protect the licensed property, on behalf of the Federal Government.

(c) *Record of determinations.* NASA shall maintain a record of determinations to grant exclusive or partially exclusive licenses.

Procedures

§ 1245.207 Application for a license.

An application for a license should be addressed to the Patent Counsel at the NASA installation having responsibility for the invention and shall normally include:

(a) Identification of the invention for which the license is desired, including the patent application serial number or patent number, title, and date, if known;

(b) Identification of the type of license for which the application is submitted;

(c) Name and address of the person, company, or organization applying for the license and the citizenship or place of incorporation of the applicant;

(d) Name, address, and telephone number of representative of applicant to whom correspondence should be sent;

PATENT LICENSING REGULATIONS

(e) Nature and type of applicant's business, identifying products or services which the applicant has successfully commercialized, and approximate number of applicant's employees;

(f) Source of information concerning the availability of a license on the invention;

(g) A statement indicating whether applicant is a small business firm as defined in § 1245.202(c);

(h) A detailed description of applicant's plan for development or marketing of the invention, or both, which should include:

(1) A statement of the time, nature and amount of anticipated investment of capital and other resources which applicant believes will be required to bring the invention to practical application;

(2) A statement as to applicant's capability and intention to fulfill the plan, including information regarding manufacturing, marketing, financial, and technical resources;

(3) A statement of the fields of use for which applicant intends to practice the invention; and

(4) A statement of the geographic areas in which applicant intends to manufacture any products embodying the invention and geographic areas where applicant intends to use or sell the invention, or both;

(i) Identification of licenses previously granted to applicant under Federally owned inventions;

(j) A statement containing applicant's best knowledge of the extent to which the invention is being practiced by private industry or Government, or both, or is otherwise available commercially; and

(k) Any other information which applicant believes will support a determination to grant the license to applicant.

§ 1245.208 Processing applications.

(a) Applications for licenses will be initially reviewed by the Patent Counsel of the NASA installation having responsibility for the invention. The Patent Counsel shall make a preliminary recommendation to the Director of Licensing, NASA Headquarters, whether to: (1) grant the license as requested, (2) grant the license with modification after negotiation with the licensee, or (3) deny the license. The Director of Licensing shall review the preliminary recommendation of the Patent Counsel and make a final recommendation to the NASA Assistant General Counsel for Patent Matters. Such review and final recommendation may include, and be based on, any additional information obtained from applicant and other sources that the Patent Counsel and the Director of Licensing deem relevant to the license requested. The determination to grant or deny the license shall be made by the Assistant General Counsel for Patent Matters based on the final recommendation of the Director of Licensing.

(b) When notice of a prospective exclusive or partially exclusive license is published in the **Federal Register** in accordance with § 1245.206(a)(1)(iii)(A) or § 1245.206(b)(1)(i), any written objections received in response thereto will be considered by the Director of Licensing in making the final recommendation to the Assistant General Counsel for Patent Matters.

(c) If the requested license, including any negotiated modifications, is denied by the Assistant General Counsel for Patent Matters, the applicant may request reconsideration by filing a written request for reconsideration within 30 days after receiving notice of denial. This 30-day period may be extended for good cause.

(d) In addition to, or in lieu of requesting reconsideration, the applicant may also appeal the denial of the license in accordance with § 1245.211.

§ 1245.209 Notice to Attorney General.

A copy of the notice provided for in §§ 1245.206(a)(1)(iii)(A), and 1245.206(b)(1)(i) will be sent to the Attorney General.

§ 1245.210 Modification and termination of licenses.

Before modifying or terminating a license, other than by mutual agreement, NASA shall furnish the licensee and any sublicensee of record a written notice of intention to modify or terminate the license, and the licensee and any sublicensee shall be allowed 30 days after such notice to remedy any breach of the license or show cause why the license should not be modified or terminated.

§ 1245.211 Appeals.

(a) The following parties may appeal to the NASA Administrator or designee any decision or determination concerning the grant, denial, interpretation, modification, or termination of a license:

(1) A person whose application for a license has been denied;

(2) A licensee whose license has been modified or terminated, in whole or in part; or

(3) A person who timely filed a written objection in response to the notice required by §§ 1245.206(a)(1)(iii)(A) or 1245.206(b)(1)(i) and who can demonstrate to the satisfaction of NASA that such person may be damaged by the Agency action.

(b) Written notice of appeal must be filed within 30 days (or such other time as may be authorized for good cause shown) after receiving notice of the adverse decision or determination; including, an adverse decision following the request for reconsideration under § 1245.208(c). The notice of appeal, along with all supporting documentation should be addressed to the Administrator, National Aeronautics and Space Administration, Washington, DC 20546. Should the appeal raise a genuine dispute over material facts, fact-finding will be conducted by the NASA Inventions and Contributions Board. The person filing the appeal shall be afforded an opportunity to be heard and to offer evidence in support of the appeal. The Chairperson of the Inventions and Contributions Board shall prepare written findings of fact and transmit them to the Administrator or designee. The decision on the appeal shall be made by the NASA Administrator or designee. There is no further right of administrative appeal from the decision of the Administrator or designee.

§ 1245.212 Protection and administration of inventions.

NASA may take any suitable and necessary steps to protect and administer rights to NASA inventions, either directly or through contract.

§ 1245.213 Transfer of custody.

NASA having custody of certain Federally owned inventions may transfer custody and administration in whole or in part, to another Federal agency, of the right, title, or interest in any such invention.

§ 1245.214 Confidentiality of information.

Title 35, United States Code, section 209, provides that any plan submitted pursuant to § 1245.207(h) and any report required by § 1245.204(b)(6) may be treated by NASA as commercial and financial information obtained from a person and privileged and confidential and not subject to disclosure under section 552 of Title 5 of the United States Code.

James M. Beggs,

Administrator.

October 15, 1981.

[FR Doc. 81-31609 Filed 10-30-81; 8:45 am]

BILLING CODE 7510-01-M

1. Report No. NASA SP-7039 (39)		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle NASA Patent Abstracts Bibliography A Continuing Bibliography Section 1: Abstracts (Supplement 39)				5. Report Date July 1991	
				6. Performing Organization Code NTT	
7. Author(s)				8. Performing Organization Report No.	
				10. Work Unit No.	
9. Performing Organization Name and Address NASA Scientific and Technical Information Program				11. Contract or Grant No.	
				13. Type of Report and Period Covered Special Publication	
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, DC 20546				14. Sponsoring Agency Code	
15. Supplementary Notes Section 1: Abstracts.					
16. Abstract Abstracts are provided for 154 patents and patent applications entered into the NASA scientific and technical information system during the period January 1991 through June 1991. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or patent application.					
17. Key Words (Suggested by Author(s)) Bibliographies Patent Policy NASA Programs			18. Distribution Statement Unclassified - Unlimited Subject Category - 82		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		22. Price * A04/HC	
				21. No. of Pages 62	

**National Aeronautics and
Space Administration
Code NTT-4**

**Washington, D.C.
20546-0001**

Official Business
Penalty for Private Use, \$300

**BULK RATE
POSTAGE & FEES PAID
NASA
Permit No. G-27**



**POSTMASTER: If Undeliverable (Section 158
Postal Manual) Do Not Return**
